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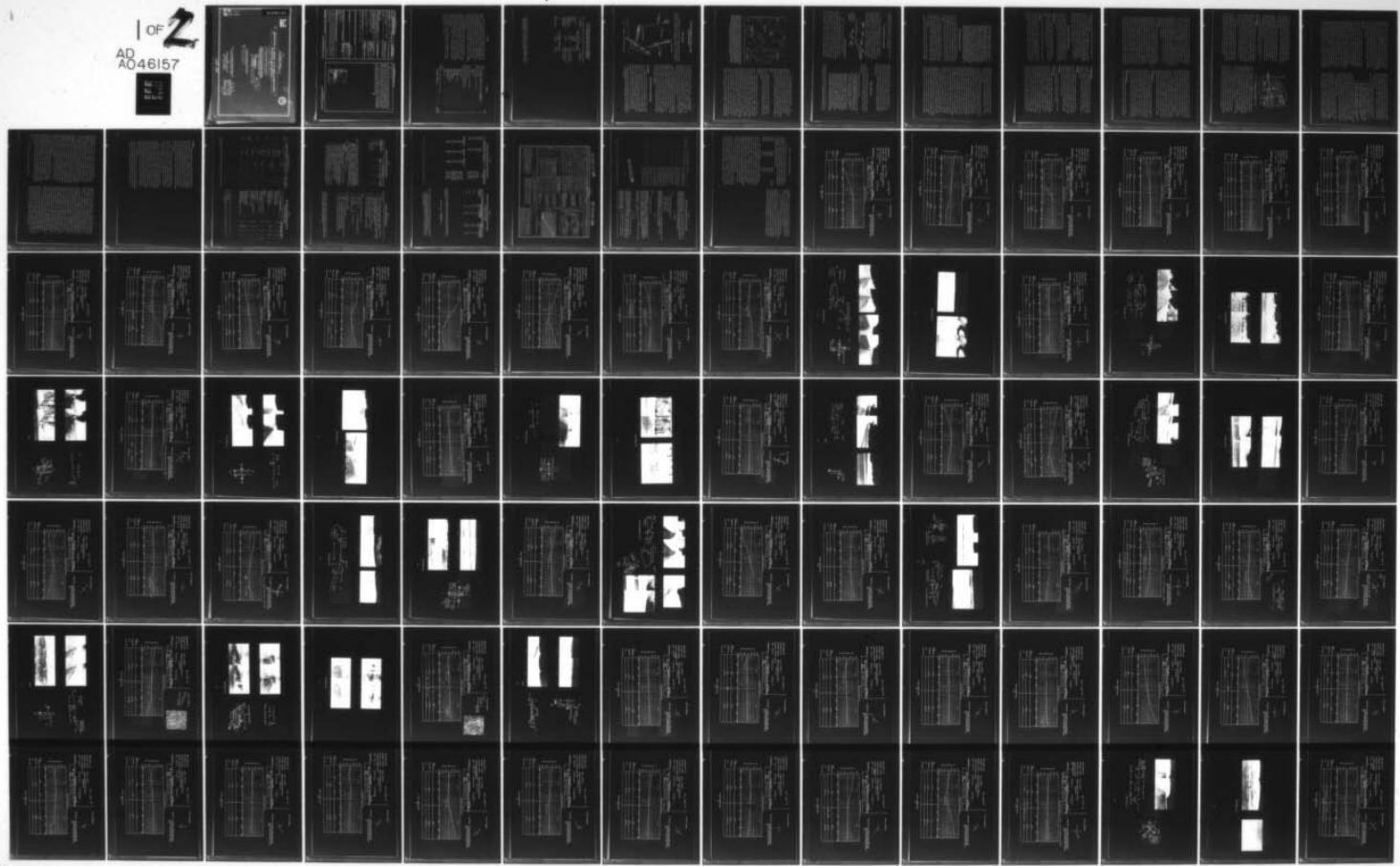
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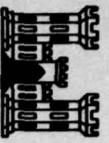
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**DESCRIPTION OF TERRAIN TO BE USED IN EVALUATING
THE LOFTED MINE CONCEPT.**

by

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Sept [redacted] 77

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Final Report. Jun - Nov 74

Approved for Public Release: Distribution Unlimited

16
4A76273/04742

Prepared for U. S. Army Materiel Systems Analysis Agency
Aberdeen Proving Ground, Maryland 21005

and

Office, Chief of Engineers, U. S. Army
Washington, D. C. 20319
Under Project 4A762730A742

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REPRODUCED BY GOVERNMENT CONTRACTOR



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REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS
BEFORE COMPLETING FORM

1. REPORT NUMBER

Miscellaneous Paper M-77-11

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2. GOVT ACCESSION NO.

1

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and subtitle)

DESCRIPTION OF TERRAIN TO BE USED IN EVALUATING
THE LOFTED MINE CONCEPT

5. TYPE OF REPORT & PERIOD COVERED

Final report

6. PERFORMING ORG. REPORT NUMBER

Project 4AT62730ATH42

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ABSTRACT (Continued).

The data are presented on profile diagrams representing transects intercepting the road at right angles and extending 200 m to the right and left from the road center line. The data include a topographic profile along the transect line, slope orientation of the profile, and vegetation, soil, and roadway characteristics to the extent that the relevant data were inferable from the available data sources or from on-site inspection. Selection of the terrain characteristics for description was based on their presumed interactions with various functional phases of the proposed lofted mine system.

The data constitute information exhibiting the considerable variation found within the study area. Analysis of the data in terms of performance of the proposed mine systems can be made by inference or more adequately by use of quantitative performance prediction models.



10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

Area 4

Project 4AT62730ATH42

11. REPORT DATE

September 1977

12. NUMBER OF PAGES

165

13. SECURITY CLASS. (of this report)

Unclassified

14. DECLASSIFICATION/DOWNGRADING

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Preface

Personnel of the Mobility and Environmental Systems Laboratory (MESL), U. S. Army Engineer Waterways Experiment Station (WES), conducted the study reported herein during the period June-November 1974. The study was funded for the most part by the U. S. Army Materiel Systems Analysis Agency (USAMSA), Aberdeen Proving Ground, Maryland, by DA Form 2544, No. 75-A04, dated 15 July 1974. However, funds for the field work in Germany and for publishing the report were from Technical Effort E3, Terrain Operations Simulation of the U. S. Army Corps of Engineers Project 4A762730A142. Mr. Frank Leopold of USAMSA monitored the program.

This study was under the general supervision of Messrs. W. G. Shockley, Chief, MESL; W. E. Grabau, Special Assistant, MESL (formerly Chief of the Environmental Systems Division (ESD)); and B. O. Benn, Chief, ESD. Mr. J. R. Lundien, ESD (formerly Chief, Environmental Research Branch), directed the study. Mr. Grabau conducted the field work in West Germany, and Messrs. E. E. Addor, Aquatic Plant Research Branch, ESD, and E. E. Garrett (now retired) assembled the data and prepared the report.

Directors of the WES during the study and preparation of this report were COL G. H. Hilt, CE, and COL J. L. Cannon, CE. Technical Director was Mr. F. R. Brown.

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Conversion Factors, Metric (SI) to U. S. Customary and
U. S. Customary to Metric (SI) Units of Measurement

Units of measurement used in this report can be converted as follows:

Multiply _____ By _____ To Obtain _____

Metric (SI) to U. S. Customary

centimetres	0.3937007	inches
metres	3.280839	feet
kilometres	0.6213711	miles (U. S. statute)
grams per cubic centimetre	62.42797	pounds (mass) per cubic foot
neutrons per metre	0.7375621	pounds (force) per foot
Celsius degrees or Kelvins	1.8	Fahrenheit degrees*

U. S. Customary to Metric (SI)

feet	0.3048	metres
degrees (angular)	0.01745329	radians

* To obtain Fahrenheit (F) degrees from Celsius readings, use the following formula: $F = 1.8(C) + 32$. To obtain Fahrenheit readings from Kelvins, use: $F = 1.8(K - 273.15) + 32$.

DESCRIPTION OF TERRAIN TO BE USED IN EVALUATING

THE LOFTED MINE CONCEPT

Purpose and Scope

1. The purpose of this study was to describe terrain in a selected area in West Germany to be used by the U. S. Army Mobility Systems Analysis Agency in evaluating the lofted mine concept. As shown in Figure 1,

the concept involves five functional phases: (a) ground emplacement, (b) target detection (by seismic or acoustic signal), (c) mine loft, (d) target fix, and (e) projectile strike. The specific requirement was for a set of site descriptions representing the range of variations in road and roadside terrain conditions within the area. Emphasis in this requirement was on the idea of realism, i.e. entirely possible and highly probable combinations of terrain conditions, as distinct from real, i.e. exact truth as to actual existing conditions.

2. Terrain information on 104 sites (Appendix A) was obtained by inference from conventional topographic maps and available aerial photographs, and from on-site photographs and field notes taken by U. S. Army Engineer Waterways Experiment Station (WES) personnel who were in Germany on another assignment while this study was in progress. This document contains: (a) a general description of the study area, (b) a general description of the road net within the study area, (c) an explanation of the sample site selection procedure, (d) a brief discussion of problems relating to data acquisition and presentation, and (e) definitions of terms and explanation of specific data items shown on the profile data sheets in Appendix A.

General Description of the Study Area

Physiography

3. The prescribed study area is circular with a radius of 75 km* and is centered on the divide between the watersheds of the Main River and principal tributaries of the Weser, at a point approximately 60 km northeast of Frankfurt-Am-Main and 35 km west of Fulda, in West Germany (Figure 2). The principal physiographic features are floodplains and gentle hills. Elevations range generally between 200 and 500 m, with some river valleys less than 200 m (minimum about 95 m at Frankfurt) and some peaks in the central portion of the area exceeding 700 m (maximum of 773 m, on Taufstein, very near the center of the area).

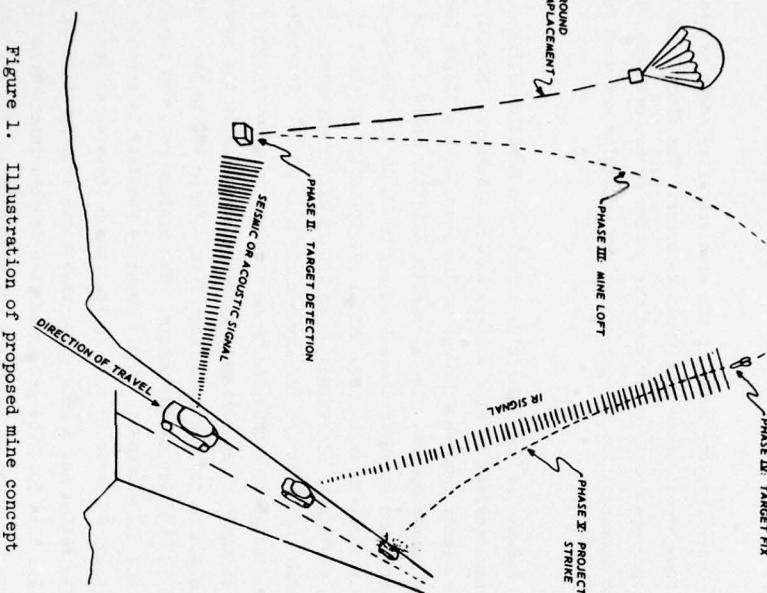


Figure 1. Illustration of proposed mine concept

* A table of factors for converting metric (SI) units of measurement to U. S. customary units and U. S. customary units to metric (SI) units is given on page 3.

4. The basic drainage system is shown in Figure 2. In the southern and western portions, drainage is primarily via the Main River and its tributaries, the more important of which are the Frankische Saale skirting the study area on the extreme southeast, the Kinzig, Nidder, and Nidda draining the south-central portion, and the Lahm draining the western quadrant. North of the divide, the Eder, tributary to the Fulda, flows eastward across the extreme northwestern portion of the area; the Schmalz is tributary to the Eder and drains the northeast central portion; and the northeast quadrant is drained by the Fulda and the Ulster.

Soils

5. Generally, the soils of the area are silty sands or sandy silts, although most other soil types do occur. The floodplains and gentle slopes are mostly cultivated for garden crops, orchards, vineyards, and hopyards; the steeper slopes and mountains are used for commercial forest.

Climate

6. Because of the moderating effect of a maritime climate, the area is characterized by mild winters and cool summers. Monthly precipitation is nearly constant throughout the year, with a slight increase during the summer months. The average is slightly below 5 cm per month in the winter and slightly above 5 cm per month during the summer. Most of the area receives an average annual precipitation of about 55 cm, although in the higher elevations up to 100 cm can be expected. The maximum recorded precipitation for any one month is 20 cm. Increases in summer precipitation correspond to an increase in thunderstorm frequency, about 20 storms per year with the majority occurring in the summer. The mean temperatures for the area range from -1°C to 4°C in the winter and from 10°C to 24°C during the summer. The minimum recorded temperature is -23°C and the maximum is 38°C. Relative humidity is greater in the winter (around 85 percent) than in the summer (between 65 and 70 percent). The region has a snow cover that lasts from 20 to 70 days, but usually less than 50. The ground surface freezes intermittently during the winter, but normally to only a few centimetres. The average number

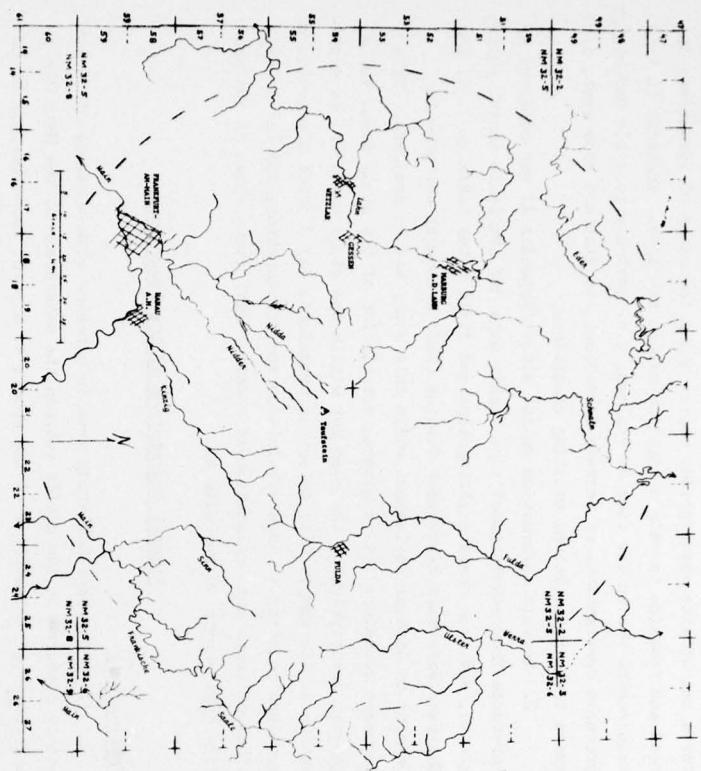


Figure 2. Index map of the study area, based on the Militärgeographische Dienststelle Series M-501 Universal Transverse Mercator Grid Zone 32 (original scale 1:250,000). (The numbers outside the margin denote the map numbers for Series M-745 at 1:50,000; the numbers inside the margin denote the map numbers for the corresponding 1:25,000 topographic maps by the Hessisches Landesvermessungsamt. Read the right margin first; for example, Wetzlar is shown on map number 15516 of the series at 1:50,000, and on numbers 5416 and 5417 of the 1:25,000 scale maps. Large dashed circle is approximate limits of the study area.)

of cloudy days per year exceeds 200. During the winter months, dense fogs commonly occur decreasing visibility considerably.

General Description of the Road Net

7. The use of standard maps and air photos for information sources limits the kinds of information that can be obtained on road construction materials and design specifications. For this study, the roads in the study area are grouped into five classes based upon conventional mapping criteria. The requirement for realism rather than on-site accuracy allows for some generalization without loss of utility for the present purpose. A cross section showing the range of typical design configurations for surfaced roads is diagrammed in Figure 3.

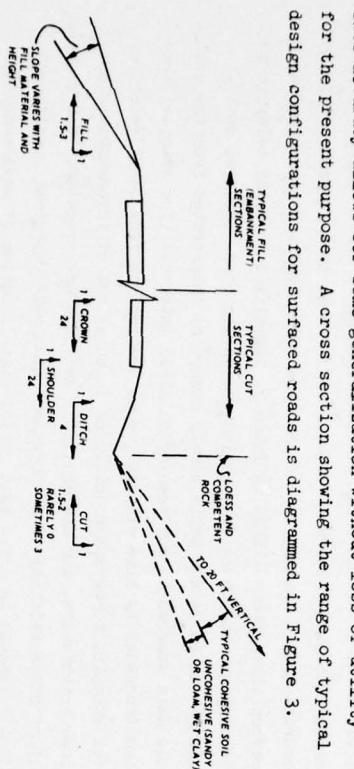


Figure 3. Typical road cross-section characteristics
Department of the Army, TM 5-150, "Engineering, Site Selection, and Design of Roads, Bridges, and Waterways in Seismic Areas," Chap. 1, Fig. 1-1.

8. The five road classes defined for this study in Table 1 are: dual highways (including autobahns), trunk roads, secondary roads, light-duty all-weather roads, and farm and forest roads. The autobahns differ from other dual highways in that they have limited access, the median strip is at least 4 m wide (but may be wider) (analogous to the interstate highways in the U. S.), while access to other dual highways may or may not be controlled, and the median strip may be less than 4 m wide (but also may be wider). The two lanes in either case may be on separate alignments. In addition, there are two typical construction

specifications that may be used for class 1 roads, depending upon whether the surface is concrete or asphalt.* Hence, in Table 1, sub-classes a and b are defined for this class, but these are not distinguished in the site description data since they are not distinguished on conventional maps. The seismic characteristics of the two subgroups would probably be significantly different; for example, seismic energy will couple more readily with asphalt but will propagate more readily through concrete.

Sample Site Selection

9. Within the prescribed study area, sample sites were selected according to an a priori set of rules designed to ensure equal probability that all relevant terrain factor combinations would be represented in the survey.

10. The selection procedure was as follows:

- a. A composite index map sheet was compiled for the 1:50,000- and 1:25,000-scale topographic map series by U. S. Army Research-Europe (USAREUR) Engineer Topographic Center, and equivalent German agencies covering the study area.
- b. On each grid square representing a 1:50,000 sheet that covered any portion of the study area, the geometric center of the northeast quadrant was located.
- c. Starting at the top center of the circular study area (see paragraph 3) and progressing left to right along the grid rows to the bottom of the circle, a line was drawn from the center points (established in b above) to the north, northeast, or east, in turn, on each such quadrant that fell one half or more within the boundary of the study area circle. The purpose of alternating the direction of these transect lines was to avoid biasing the selection of samples with the "topographic grain" of the country, if any. For this reason, when the prescribed line of direction in any grid square on a row was the same as the direction in the grid square immediately above, the directional sequence was adjusted (i.e. by skipping to the next direction), so that no two

* The term "concrete" means only portland cement concrete, while the term "asphalt" means a mixture of aggregate with any asphaltic binder.

adjacent grid squares were transected in the same direction. (This adjustment was required on two rows.)

These a priori transect lines were transferred from the index grid sheet to the corresponding 1:50,000- or 1:25,000-scale maps (the latter were always used when available). Starting at the point of origin of each of these lines (i.e. at the center point of the northeast quadrant of the 1:50,000-scale map, or the center of the 1:25,000 maps), and moving outward along the directed line, a site was established at the first encounter with a road, or any class (as defined in Table 1) not within a village or urban area. At that point a line was drawn perpendicular to the road, and that line marked the location and direction of a topographic profile traverse line. The next site was selected by proceeding along the directed transect line to the first encounter with a road of any other class and drawing a profile traverse line perpendicular to the road at that intercept. This procedure was continued until one sample was located for each road class encountered along the prescribed transect line from the center of the map to the map boundary.

Data Requirements and Acquisition

11. Time and scope limitations on this study required that specific site descriptive data be obtained from readily available maps and photographs. The sponsor requested additionally that site descriptions be presented in the form of profiles perpendicular to the road and extending to a distance of 200 m on each side. These constraints posed several problems in data acquisition and data presentation, two of the more important being informational content of the data sources, and scale.
12. A minimal list of environmental factors that appear to be relevant to an evaluation of the proposed mine concept is presented in Table 2. This list was compiled from a careful consideration of the tentative functional characteristics (Figure 1) of the proposed mine system in relation to known interactions between terrain and similar kinds of material systems, or material systems employing similar functional components.
13. The mine system concepts to be evaluated with these data require that, in addition to the surrounding terrain, the roadways

themselves be defined as part of the terrain system, since roads have seismic and acoustic characteristics different from native terrain, according to their material content and structural details. Table 2 therefore also includes a list of attributes of roads that are relevant to the present problem.

14. The form that was developed for presenting the data derived from interpretation of the maps and photographs available for this study is that used in Appendix A. The central feature of the form is the topographic profile, drawn at a scale exaggerated from the map scale, and supplemented by descriptive information on other relevant environmental factors in such a way that association of class values for the various selected factors is immediately evident upon inspection of the recorded data. Examination of the data form reveals some discrepancies between those items listed in Table 2, identified as being relevant to the purpose, and those data called for on the form. Several of the factors listed on the table simply cannot be interpreted from the available data sources in any meaningful class intervals (for example, tree stem frequency by size classes), some are derived from other relations (for example, topographic shielding is an effect of topographic slope, slope orientation, and microrelief), and some are transient (for example, all of those relating to or dependent upon meteorological conditions). Also, it should be noted that useful classification of environmental factors (i.e. identification of class limits for materiel performance evaluation including concept evaluation) depends largely on knowledge of specific physical and functional characteristics of the materiel.

15. The problem of scale can best be appreciated by realizing that at a scale of 1:25,000 (the maximum scale of the available topographic maps and the approximate scale of the available aerial photographs), a distance of 200 m on the ground is less than 1 cm on the map or photograph. A topographic profile drawn at this scale cannot include the detail of topographic shielding, microrelief, and vegetation that is necessary for an evaluation of the functional aspects of the proposed mine concepts. For this reason, the profiles had to be drawn at an exaggerated scale, which has the disadvantage, however, of providing

the capability for presenting detail that is not interpretable from the available data sources.

16. A lesser problem of data presentation for this study relates to the choice of presentation mode. A map is capable of showing both vertical (by symbol) and horizontal relations on a two-dimensional plane, i.e., an area; whereas, a profile shows vertical phenomena graphically but is restricted to showing horizontal relations only along a line. Even so, a profile has a conspicuous advantage over a map display, especially for the present purpose, because the vertical relations are more readily perceived on a profile than on a map, and proposed mine systems operate mostly in the vertical plane.

Explanation of the Sample Site Data

17. This section explains the items of information on the data sheets (Appendix A) in approximate order of appearance thereon. Each discussion is complete with rationale, formal definition (when appropriate), procedure used for obtaining the information from the available maps or air photos, and explanation for the omission of some of the data called for on the sheets.

Sample number

18. The sample sites are numbered sequentially in the order selected. The sequence therefore starts near top center of the circular study area and continues thence left to right across the rows of map sheets to the bottom center of the circular area.

Date

19. Day, month, and year when the data were compiled are listed.

Map number

20. For this study, all maps were prepared by USAEUR Engineering Topographic Center and the Hessisches Landesvermessungssamt and are identified by the map number. The maps are at scales of 1:50,000 and 1:25,000 (the former being distinguished by the letter L being prefixed to the identification number), with contour intervals of 10 m and supplemental contour intervals at 5 m and sometimes 2.5 m. The publication dates vary.

Coordinate location

21. The geographic coordinates for the site are given by longitude and latitude in degrees, minutes, and seconds, estimated by interpolation. Space is provided on the data form for recording the site location according to the Universal Transverse Mercator (UTM) grid coordinates (or other coordinate system), but these are not recorded in the present study.

Landscape

22. The purpose of this information is simply to provide the user with a mental image of a landscape within which to view the profile data. It is not intended at this time to have other analytical value, though landscapes could be classified for statistical evaluation. The information consists of a brief narrative description (about two to five words) of the general landscape through which the road passes at the sample site location; for example, cultivated floodplain, cultivated floodplain and forested slope, wooded upland.

Road class

23. The road class at the sample site is identified (see paragraphs 7 and 8) according to the definitions in Table 1.

Road direction

24. Because the profile transect extends on both sides of the road, and because there is some convenience in referring to these extensions as left and right, it is necessary that the viewing direction along the road be known. In addition, if the direction of the road at the sample site location is recorded, it is possible that the directional data could be analyzed for trends that will relate to the regional topographic "grain." For these purposes, it is necessary that a road be regarded as having only one direction. The direction of a road at the transect sample site is defined in accordance with the mapping convention that north is toward the top of the map sheet. Thus, the direction of a road is defined as the compass bearing of the road toward the north (north or west) or east, i.e. a road bearing exactly east-west at the sample site is designated to be directed east, while a road bearing in any other direction is designated to be directed

toward the north. The map reader (or in a field sampling program, the surveyor) faces to the north or to the east on a road and the segments (limbs) of the profile transect on his left and right hands are designated as left and right, respectively. If the sample point is on a curve in the road, the direction of the road at that point is designated as the direction of the tangent to the curve at that point.

25. For the present purpose, it is considered sufficient for the road direction to be given in terms of the traditional designators for major points of the compass (NW, N, ... E), by approximation only. (NOTE: The person who collected the on-site photographs and cross-sectional detail included in Appendix A was not instructed on this convention. Consequently, there are cases where none of the photographs are correctly oriented to the topographic profile as shown on the data sheet. By convention, the first photograph, or first stereo pair, at each site should have been so oriented.)

Road site type

26. The placement of the road with respect to the topographic surface on which it is situated determines to a large extent the topographic details of the roadbed cross section, depending on the engineering specifications of the road (i.e. the road class), and determines the exposure of the road to observation from the adjacent terrain. Knowledge of the topography at the site would thus provide a basis for evaluating the potential terrain shielding of the road, or the potential vulnerability of an object on the road to attack. The general topographic setting of the road at the sample site can be classified according to the general geometric shape of the topographic profile at the site, but an attempt to include in the site type classification the roadbed elevation with respect to the native surface (i.e. cut, fill, on grade, etc.) was not successful. Although such a classification was easily enough achieved (Table 3), its application was not, since the details of the roadbed cross sections are not available from the maps and photographs that were available for this study. In general, deep road cuts and fills are shown on maps as topographic features (generally as escarpments or bluffs), and the depth of cut or fill can sometimes be

approximated by interpolation between contour lines. The map interpolation techniques, while simple in principle, require some practice, and the time limitations for this study precluded the development of a suitable rationale and the acquisition of skills necessary to use this concept in the profile data. A road traversing a marsh or wetland is usually on a fill (embankment), but the height of the fill is usually much less than a contour interval on these maps, and not of sufficient height as to appear as a topographic feature on our photographs.

27. For this study, then, road site type is identified only according to the general topographic profile configuration, as classified in Table 3, and is indicated by a single digit in this space on the profile data sheets. In some instances, as when a reversal occurs in the profile curve, the site type is designated for the left and right limbs of the profile, respectively. (Example: 3/2 indicates a concave profile to the left of the road and a convex profile to the right.) On the diagrams all profiles are depicted with the road assumed to be on a typical simple bench or on grade, and the roadbed width is not drawn to scale.

Road construction

28. The road construction information requested on the data form is not available from standard topographic maps or from the serial photos used in the study, and therefore this information is omitted from the profile data sheets, except that some data (surface materials, width of traffic lanes, and shoulder width) are given for some of the sites that were field-inspected. However, typical construction details for the defined road classes are shown in Table 1, which may be used to surmise the construction details at any site. If true information on the construction of the road at any specific site later becomes available, as, for example, from field observation or from engineering drawings or specifications, that information should be entered on the data forms.

Topographic profile

29. The topographic profile shows the slopes and elevations, relative to the road center line, along a transect line perpendicular

to the direction of the road (as defined above) at the sample site.

Note that these profiles represent the surface configuration along a

single line perpendicular to the road, and do not necessarily represent the maximum topographic slope toward or away from the road at the site.

This latter relation is defined as slope orientation, explained in paragraphs 32-34 below.

30. The profiles were compiled from topographic maps by scaling the distance between intercepts of the profile traverse lines with the topographic contour lines. On profiles derived by this procedure, the elevation interval is equal to the contour interval, the horizontal interval is dependent upon the slope, and the slope is assumed to be uniform between contour lines, even though on the ground slope variations approaching (but not exceeding) the contour interval may occur anywhere between the contour lines.

31. The contour interval on the maps used for this study is 10 m, with 5 m and sometimes 2.5-m supplemental contour intervals.

Slope orientation

32. Slope orientation is defined as the aspect of the slope expressed in relation to the direction of the road. Slope orientation is measured as the angle between the line of maximum downslope and the profile traverse line, turned toward the road (Figure 4). The reason for defining slope orientation in this way lies in the context; i.e. rather than viewing the slope from the road, the road is viewed from the slope, which is the perspective from which the lofted mine would have to operate. If there is no slope, or if the slope is negligible, orientation as here defined does not exist and is recorded on the data form as "N/A" or "NONE."

33. By definition, a slope orientation angle may equal but may never exceed 180 deg. A slope orientation angle of less than 90 deg

will indicate a slope facing toward the road, with 0 deg being a slope directly facing the road (contour lines parallel to the road); a slope orientation angle of more than 90 deg will indicate a slope facing away from the road, with 180 deg being a slope faced directly away. For slope orientation angles from 0 to 90 deg, an object launched

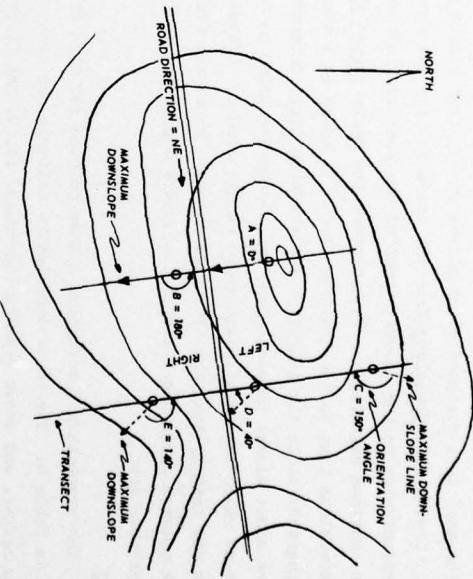


Figure 4. Definition of slope orientation angle with examples A through E

normal to the slope plane will approach the road in the direction of slope, or as viewed from the road, at a horizontal angle that is the complement of the slope orientation angle, since these are the base angles of a right triangle defined by the road, the traverse line, and the downslope line. For slope orientation angles greater than 90 deg, an object launched normal to the slope plane will be directed away from the road at a horizontal angle equal to the orientation angle minus 90 deg. The slope orientation is independent of the true topographic slope, as measured relative to the horizontal, but the greater the slope the greater is the significance of the orientation.

34. At the scale of the maps used for this study (1:25,000 and 1:50,000), it was impractical to estimate the slope orientation more than once on each 200-m limb of the traverse, except when the traverse encountered extreme variation in topography, such as a slope reversal (as at a ridge or valley), a cliff, or the like. The instructions given for determining slope orientation were as follows (see examples A

through E in Figure 4): From the road, move outward along the traverse limb (on the map) to a distance about midway on the limb (100-m ground distance). Draw a line downslope from the traverse line and approximately perpendicular to the general trend of the contour lines at that point (i.e. maximum downslope). Then measure the angle toward the road from the downslope line to the traverse line. If there is a sharp break in the topography along the length of the traverse limb, determine slope orientation about midway on each slope and record the point on the traverse limb at which the significant slope change occurs. (These instructions are readily adaptable to field surveys, where the fieldman would walk outward along the traverse line, face downslope, and turn the angle toward the road.)

Vegetation

35. The vegetation description scheme adopted for this study is presented in Table 4. The basic descriptive criteria are crown type, vegetation height, and crown spacing (coverage) (A, B, and C, respectively, on the table), and the vegetation along the profile traverse line is identified by a set of three numbers representing classes of these descriptive criteria, in that order. Six crown types are recognized and numbered more or less according to potential relative height growth (i.e. relative height of the type when fully mature).

There are six height classes and five crown spacing classes recognized, but these (for the sake of simplifying the present problem) are not all independent of crown type. Thus, any land area with vegetation less than 10 cm tall is defined as barren and recorded as class 1 for all three descriptive criteria (i.e. described as type III); herbaceous vegetation (crown class 2) is intended to include grasslands and field crops, including forage crops, and is always presumed to be height class 2 or 3, according to the height of the crop at maturity; and shrubs (crown class 3) are intended to include any and all woody vegetation currently in height class 2 or 3, regardless of crown shape or branching habits and regardless of its potential for increased height growth. Only plants more than 3 m tall, and all such plants regardless of crown shape or branching habit, are considered to be trees; in this

scheme only three height classes are applicable to trees. Of the five crown spacing (coverage) classes, class 1 is reserved for crown type class 1 (barren), but the others apply to all crown type and height class combinations. The percentage values shown for the crown spacing classes in the table are crude approximations of the mathematical relations between the areal concept of coverage and the linear concept of spacing as defined.

36. By the definitions, 52 descriptive class combinations are allowed in the scheme (Table 5). Some typical examples follow:

- a. For a conifer forest, estimated to be about 25 m tall, with a closed canopy, the designation is 665.
- b. For a mixed broadleaf-conifer stand, estimated to be 15 m tall, spaced 3-5 crown diameters, the designation is 553.

- c. For a potato field (height less than 1 m), with spacing between the rows about equal to the row crown width (50 percent coverage), the designation is 224.

- d. If a traverse crosses a pasture (grass, 10-90 cm tall) and then enters a stand of hardwood trees 10 m tall with a closed canopy, vegetation designation is 225/555.

37. If there is a significant (sharp and easily recognized) change in vegetation type along the length of the traverse, the point on the traverse (distance from the road) at which the change occurs is marked on the data sheet, and the vegetation type is identified on both sides of the mark (example d above). If part of the required data for a vegetation type is not available (e.g., crown type is identified from the map as coniferous, but photographs are not available for other data), an X is placed in the number set to fill the position normally occupied by the missing descriptive class value.

38. Note that in this scheme, crown spacing is defined in terms of crown diameters. That is, the distance between the margin of one plant crown and the next is measured in multiples of the (average) crown diameter (in practice, visually averaged distances and diameters for the stand are used, rather than absolute measurements of specific trees). This definition of spacing is entirely relative and does not include absolute values for either crown diameter or crown spacing; the value of the definition lies in the ease with which spacing can be

estimated from the air photos, since it is entirely independent of photograph scale or plant size. Further, the relation between percentage of crown cover and crown spacing by this definition is constant, regardless of crown diameter. However, the forests within the study area are mostly intensively managed, well-groomed stands that are relatively homogeneous with respect to tree dimensional relations and position. The relations between the classification criteria used in this classification scheme and other dimensional characteristics that are relevant to the purpose of this study may be inferred from Table 6.

39. The vegetation descriptive classes defined here are numbered according to presumed increasing deleterious effect on the function of the proposed mines. Thus, other conditions being equal, type 665 would represent the most difficult situation in which the mine system would be expected to operate. The effect of vegetation on the performance of the proposed mine will of course depend on a complex set of relations among the vegetation itself, the vegetation in relation to topography, and the mechanical properties of the mine. The vegetation descriptive scheme used here is intended to provide alternative descriptors (by inference or by correlation) that are required for the WES missile trajectory model, which predicts the performance probabilities of a missile as a function of vegetation, topography, and the physical and mechanical characteristics of the missile.

40. Species identification was not attempted for this study, since species are not normally identifiable from either conventional topographic maps or air photos, except by persons intimately familiar with the forests and crops of the region under consideration. For a field data collection program or a more intensive literature research, provision would be included on the data form for recording at least the one or two species that predominate in the stand at each site. Certain vegetation characteristics that are useful in some material performance prediction models, such as mechanical properties of wood, are related to species.

Soil

41. Soil information is recorded on the data sheets in a

combination of letter and number codes. The letter code (two letters) identifies the soil type according to the Unified Soil Classification System (USCS) shown in Table 7. The number code, from 1 to 21, identifies a specific combination of soil and road factors that affect the generation and propagation of seismic energy from vehicles, as listed in Table 8. The factors listed in Table 8 are defined in Table 9.

42. The basic information concerning soil properties was derived from pedological and geological maps published by West Germany governmental agencies. This information was supplemented by correlation of soils with topography and land use, as interpreted from aerial photographs and topographic maps. The derived information was interpreted for each site to arrive at the probable soil classification according to the USCS. The accumulated information was then used to identify the seismic factor classification from Table 8. This is an abstracted version of a more expansive list developed as part of a study (by the WES) of seismic signals from vehicles. The listing in this table includes those combinations of soils considered most likely to occur with the highest frequency in the study area and bracket the expectable range of seismic performance from the most to the least favorable. Since soil characteristics at the sample sites had to be inferred from the maps and photographs, and the correlation of these inferences with the terrain types estimated, as listed in the table, this presentation of seismic properties must be viewed as probabilistic rather than factual. Precise determination of the engineering and seismic propagation characteristics can be achieved only by means of on-site investigations that would include sampling and seismic refraction surveys.

43. This soil description scheme does not include temporal qualities of soil except as these are related to the descriptive criteria included in the USCS. Thus, soil penetrability, for example, is related to plasticity and to the presence of stones, which criteria are used in the USCS, but it is also related to recent rainfall history and the effects of recent cultivation, which criteria are not used in the USCS and therefore are not included in these descriptions.

Microrelief

44. Microrelief will affect the operation of the proposed mine systems through its relation to topographic shielding, its effect (if any) on seismic or sonic wave propagation, and its effect on emplacement orientation of the functional unit of the mine. However, microrelief data are not inferrable from the data sources used for this study, and time limitations precluded research of other sources for useful data.

For this reason microrelief data are not listed on the data sheets. A brief narrative description of relevant microrelief characteristics follows, from which performance requirements of the proposed lofted mines may be inferred.

45. On cultivated lands, typical microrelief features are of three types: (a) a series of parallel furrows or undulations, usually following the topographic contours; (b) randomly dispersed soil clods up to a few (10-15) centimetres in diameter strewn on an otherwise uniform soil surface; and (c) such randomly dispersed clods strewn on a furrowed or undulating soil surface, type (a).

46. In forests, typical soil surface microrelief features are probably not as important to the function of the proposed mines as are the pseudomicrorelief features created by ground vegetation and stumps. Logging debris is not a critical problem in this area, since the forests are gleaned for maximum utility, and most of the debris is therefore included as part of the product. Some of the forested land is essentially without ground cover vegetation; it may be quite smooth and carpeted with leaf and twig litter or sometimes strewn with cobblestone. The on-site photographs and microprofile sketches accompanying some of the data sheets illustrate the varieties of surface microrelief and ground-cover conditions that may be expected in various topographical and land-use contexts.

47. The data sheets provide space for notes and comments. This space is used for supplementary notes, and especially for sketching the site plan, including the road direction and curvature at the site and the location of the traverse line with respect to road curvature.

Road Classification and Design

		Typical Section, Traffic Surface			Shoulder	With	Median	Ditch	Median	Bentumeum	Total
CLASS	LAYER	THICKNESS	MATERIAL*	IN.	MATERIAL*	IN.	MATERIAL*	IN.	MATERIAL*	IN.	Length Within
DUAL											Width, M.
1 (a)	1	20	Concrete								
2	30	Sand, gravel, or crushed stone		7.5	3-1/2		Asphalt or concrete	4	2	20 x 2	
3	In situ soil			x 2							
4	8	Asphalt (or stone block)									
5	20	Gravel or crushed stone		6	Asphalt, con- crete, or gravel	3-1/2		1	2	18 x 2	

Environmental Factors Required for Evaluation of the Lofted Mine Concepts

	Environmental Factor					Mine Functional Phase*
	I	II	III	IV	V	
Meteorology						
Wind speed, direction	X**	X	-+	X	-	
Ambient temperature	-	-	-	X	-	
Precipitation or haze	-	-	-	X	-	
Surface geometry						
Topographic slope	X	(X)††	X	(X)	-	
Topographic shielding	-	X	-	X	-	
Surface microrelief	X	-	X	(X)	-	
Vegetation						
Height	X	-	X	X	-	
Crown (twig and leaf mass) density	X	-	X	X	-	
Branching habit	X	-	(X)	-	X	
Stem or branch size and frequency	-	-	X	-	X	
Surface composition						
Soil type	X	X	-	-	-	
Soil moisture	X	X	X	-	-	
Snow compaction (include freezing)	X	X	-	-	-	
Snow cover	X	X	-	-	-	
Subsurface soil layering	-	X	-	-	-	
Road design						
Road surface material	X	-	-	-	-	
Road subgrade material	-	X	-	-	-	
Road surface width	-	(X)	-	-	-	
Shoulder width	-	(X)	-	-	-	
Median strip width	-	(X)	-	-	-	
Bank and embankment height and slope	X	X	-	-	-	

1

* See Figure 1.

+ 11

++ (x) = importa

- The term "concrete" means only portland cement concrete, while the term "asphalt" means a mixture of aggregate with any asphaltic binder.

† = minor or undetermined relevance (depending upon design concepts).
 ++ (X) = important.

Table 3
Road Site Type Classification (Tentative)

Topographic Profile Configuration	Road Bed Location					
	1 On Grade	2 Fill	3 Cut	4 Part Bench	5 Full Bench	
1. Flat	X*	X	X	-**	-	
2. Convex	X	X	X	X	X	
3. Concave	X	X	X	X	X	
4. Slope, gentle	-	X	X	X	X	
5. Slope, steep (cliff)	-	-	-	-	X	
6. Conifer tree (usually evergreen, some deciduous)						

Note:

A road site type is defined by a two-digit number identifying the topographic profile configuration and the roadbed location, respectively. Examples: A road on a fill (embankment) through a swampy area is type 12 (flat topographic profile, road located on fill); a road breaking over the toe of a ridge often has site type 23, whereas a road cresting through a ridge (usually at a "saddle," or low point on the ridge) will often have site type 33.

* = probable combinations.
** = improbable or impossible combinations.

Definitions

On Grade

only for sufficient drainage.

Fill is entire roadbed raised on a solid base (i.e. not on piers) at least a metre, and often much more, above the base topographic elevation. Fill materials vary considerably, from soil or gravel to large rock, and may be obtained locally or transported from rather distant locations.

Cut is entire roadbed below the topographic elevation,

Part Bench is roadbed cut on one side and filled on the other.

It is often used on gentle slopes.

Full Bench is roadbed cut into the slope for its full width, so that there is a cut bank on one side, but no fill on the other. This is the usual construction on steep slopes.

Table 4
Vegetation Classification Criteria

A. Crown Type
1. Barren (vegetation none, or less than 10 cm tall; permanently, i.e. not to include seasonally barren cropland)
2. Herbaceous (nonwoody, greater than 10 cm tall, including grass, crop, and forage plants. Record height as class 2 or 3, corresponding with height at maturity)
3. Shrub (any woody plant 10 cm to 2 m tall)
4. Broadleaf tree (usually deciduous, some evergreen)
5. Mixed broadleaf and conifer tree
6. Conifer tree (usually evergreen, some deciduous)

B. Height
1. Less than 10 cm (for crown type 1 only)
2. 10-99 cm (low) } (for herbaceous and shrub only)
3. 1-2 m (tall) }
4. 3-5 m (short) }
5. 6-20 m (medium) }
6. More than 20 m (tall) } (for trees only)

C. Crown Spacing (coverage)
1. Barren (for crown type 1 only)
2. Sparse, 6-10 crown diameters* (less than 5 percent coverage)
3. Wide, 3-5 crown diameters (6-25 percent coverage)
4. Open, 1-2 crown diameters (26-90 percent coverage)
5. Closed, crowns contiguous (more than 90 percent cover)

* If spacing of trees or shrubs is more than 10 crown diameters, the tree or shrub component should be ignored and the vegetation classed as herb or barren (2 or 1), as the case may be.

Table 5

Vegetation Description Class Combinations (Allowed)

Number Symbols by Crown Type		Height, Crown Coverage				Stand Height to Stem Spacing and Stem Diameter*			
		Barren	Average Stand Height, m	Average Stem Spacing m	No. of Cases	Average Stem Diameter cm	No. of Cases		
111	Herb	Shrub	12-17	2-3.5	(8)	10-20	(9)		
222				4-5.5	(3)	21-25	(2)		
223		Low, sparse							
224		Low, wide							
225		Low, open							
232		Low, closed							
233		Tall, sparse	17.1-22	4-4.5	(2)	22	(1)		
234		Tall, wide				26-30	(3)		
235		Tall, open							
	Broadleaf Tree	Mixed Tree	22.5-25	2.4	(1)	15	(1)		
		Conifer Tree	26-30	4.3	(1)	28	(1)		
442		Short, sparse				25-30	(1)		
443		Short, wide							
444		Short, open							
445		Short, closed							
452		Medium, sparse							
453		Medium, wide							
454		Medium, open							
455		Medium, closed							
462		Tall, sparse							
463		Tall, wide							
464		Tall, open							
465		Tall, closed							

Table 6

Relation of Stand Height to Stem Spacing, Stem Diameter, and Height to Branching

$$\text{Branching height} = \frac{\text{Stand height} - 5}{1.25} + 7$$

On the basis of the samples used for the above, the average height of branching relates to average stand height approximately by the relation (in metres):

Note: In closed stands, as these are, an approximate 1:1 correlation obviously exists between stem spacing and crown diameter.
 * Stand averages based upon samples of 20 or more trees per stand, 21 stands represented; mostly conifer, all planted, all pruned, all closed canopy).

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Table 7

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No. or Division	Drainage	Optional Name	(Identifying Identification and Description)		Descriptive Soil Size	Laboratory Classification
			Field Identification Procedures (Excluding particle sizes larger than 1 in.)	Descriptive Soil Size		
1	1			6		7
2	2					
3	3					
4	4					
5	5					
6	6					
7	7					
8	8					
9	9					
10	10					
11	11					
12	12					
13	13					
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15	15					
16	16					
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272	272					
273	273					
274	274					

Table 8
Seismic Properties of Soils from a WES Study in Progress

Soil Type	V_p	V_s	γ_{d}	$\gamma_{d,3}$	γ_1	γ_{12}	γ_{12}	k_c	Z_{max}
Gravelly loam; sand	150	75	1.6	1.5	1.0	1.0	1.0	1.0	1.0
1	150	75	1.6	1.5	1.0	1.0	1.0	1.0	1.0
2	150	75	1.6	1.5	1.0	1.0	1.0	1.0	1.0
3	150	75	1.6	1.5	1.0	0.80	0.75	0.5	0.1
4	150	75	1.6	1.5	1.0	0.80	0.75	0.5	0.1
5	150	75	1.6	1.5	1.0	0.80	0.75	0.5	0.1
6	150	75	1.6	1.5	1.0	0.80	0.75	0.5	0.1
7	150	75	1.6	1.5	1.0	0.80	0.75	0.5	0.1
8	150	75	1.6	1.5	1.0	0.80	0.75	0.5	0.1
9	150	75	1.6	1.5	1.0	0.80	0.75	0.5	0.1
10	650	260	1.7	1.5	1.0	0.80	0.75	0.5	0.1
11	650	260	1.7	1.5	1.0	0.80	0.75	0.5	0.1
12	650	260	1.7	1.5	1.0	0.80	0.75	0.5	0.1
13	650	260	1.7	1.5	1.0	0.80	0.75	0.5	0.1
14	150	400	1.9	1.5	2.00	1.50	1.8	0.05	0.05
15	150	400	1.9	1.5	2.00	1.50	1.8	0.05	0.05
16	1450	400	1.9	1.5	2.00	1.50	1.8	0.05	0.05
17	1450	400	1.9	1.5	2.00	1.50	1.8	0.05	0.05
18	2000	500	1.8	1.0	—	—	—	—	—
19	2000	500	1.8	1.0	—	—	—	—	—
20	2000	500	1.8	1.0	—	—	—	—	—
21	2000	750	2.1	1.5	2.00	1.50	1.8	0.05	0.05

Table 9
Definition of Seismic Factors Listed in Table 8

Compression Wave Velocity (V_p): Speed of compression wave through a medium. Compression waves have the greatest velocity of any elastic wave in the same medium. The motion of the particles is parallel to the direction of propagation. V_p is defined mathematically as

$$V_p = \frac{\lambda + 2G}{\rho}$$

where

$$V_p = \text{compression wave velocity, } \text{LT}^{-1}$$

$$\lambda = \text{Lame's constant, } \text{ML}^{-1}\text{T}^{-2}$$

$$G = \text{shear modulus, } \text{FT}^{-2}$$

$$\rho = \text{mass density, } \text{GS}^{-1}\text{T}^{-2}$$

Shear Wave Velocity (V_s): Speed of a shear wave (particle motion of the medium is perpendicular to the direction of propagation) through a medium and is defined mathematically by the equation

$$V_s = \frac{G}{\rho}$$

where

$$V_s = \text{shear wave velocity, } \text{LT}^{-1}$$

Layer Thickness (H): Vertical depth (perpendicular to the surface) of soil layers as distinguished by their differing primary wave velocities. The primary wave velocities of these two layers are determined by techniques of refraction seismology. (Note: The above-defined layer often, but not necessarily, corresponds to soil layers as defined by nonseismic parameters, such as grain size and density.)

Bulk Density (γ_d): The weight (W) from a soil sample per unit of volume (V) of the sample. Symbolically this is

$$\gamma_d = \frac{W}{V} (\text{g/cm}^3)$$

Surface Rigidity Spring Constant (k_c): Spring constant for linear (elastic) approximation of loading spring. The spring constant is derived from load deflection curves and is similar to the coefficient of subgrade reaction, k_s , in the literature dealing with pavement design.

Maximum Spring Travel (Z_{max}): The maximum deflection (extrapolated from load-deflection curves) that could occur from a specified load applied to the soil surface.

BEST AVAILABLE COPY

Note: See Table 9 for explanation of symbols. Parameters 1 and 2 are applicable to loose and dense soils, respectively.
(Adapted from report by personnel in seismic field from Charles M. Miller, CH2M Hill.)

Appendix A: Roadside Terrain Descriptions

1. The profile data sheets as described in the text are presented in this appendix. They are assembled in numerical sequence from 1 through 104. The profile data sheets enumerated below are accompanied by one or two (number in parentheses) sheets of on-site photographs with, in most cases, a detailed large-scale cross-sectional profile diagram of the roadbed and immediately adjacent terrain.

14 (2)	28 (1)	58 (1)	90 (1)
15 (2)	32 (1)	59 (2)	91 (2)
16 (1)	33 (2)	60 (1)	
17 (2)	34 (1)	72 (1)	
18 (2)	53 (2)	73 (1)	
19 (1)	54 (1)	74 (2)	
21 (2)	55 (2)	75 (2)	
25 (2)	56 (2)	76 (2)	
26 (1)	57 (1)	77 (1)	

2. Most of the photographs are in stereoscopic pairs and, in general, include a view directly down the road across the ground location of the specified sample site, as defined in the text (see paragraph 10 in the main text), and one or more views to left and right from the road, or across the road, at the sample site. In some cases, additional photographs are included to show other terrain conditions or landscape features of especial interest. In general, an attempt has been made to orient the photographs and detail profile diagrams with the general topographic profile as shown on the profile data sheet. The photographer, however, was not aware of the convention that was subsequently adopted for defining road direction (see paragraph 24 in the main text), and there are therefore cases where none of the photographs are correctly oriented with the profile as shown on the data sheet.

3. In all cases, a photograph orientation sketch is included with the photographs. On this sketch, arrows originate at the location from which each photograph was taken and point in the direction of view, and circled numbers identify the respective photographs. There is no scale implied on these orientation sketches. For a few of the sites that were inspected in the field, the photographs were defective. The roadbed

detail sketches for sites 29 and 31 are shown without the photographs. In addition, a few undesignated sites were photographed as a matter of interest. Some of these are presented as supplemental photographs at the end of the appendix, numbered from 200 through 216.

4. The cross-section diagrams are drawn to approximate scale (0.1, 0.2, or 0.4 in. = 1 m), so far as the measurements provided by the field observer would permit, and the measured values are also shown on the diagram. When measurements are not specified, the values were not recorded by the field observer; the missing values have been estimated by the present editor, and the profiles drawn with the estimated values at scale. For very small measurements (25 or less) the profiles have been drawn with a bias toward exaggeration rather than generalization.

Sample Number: 1

Date: 28 Aug 74

Notes and Comments:

Map Number: L 4918 Scale: 1:50000

Coordinate Location: Geographic: 51°09'26"N 08°55'00"E

Landscape: Forested upland

Road: Class: 5 Direction: E Site Type: 2

Construction:

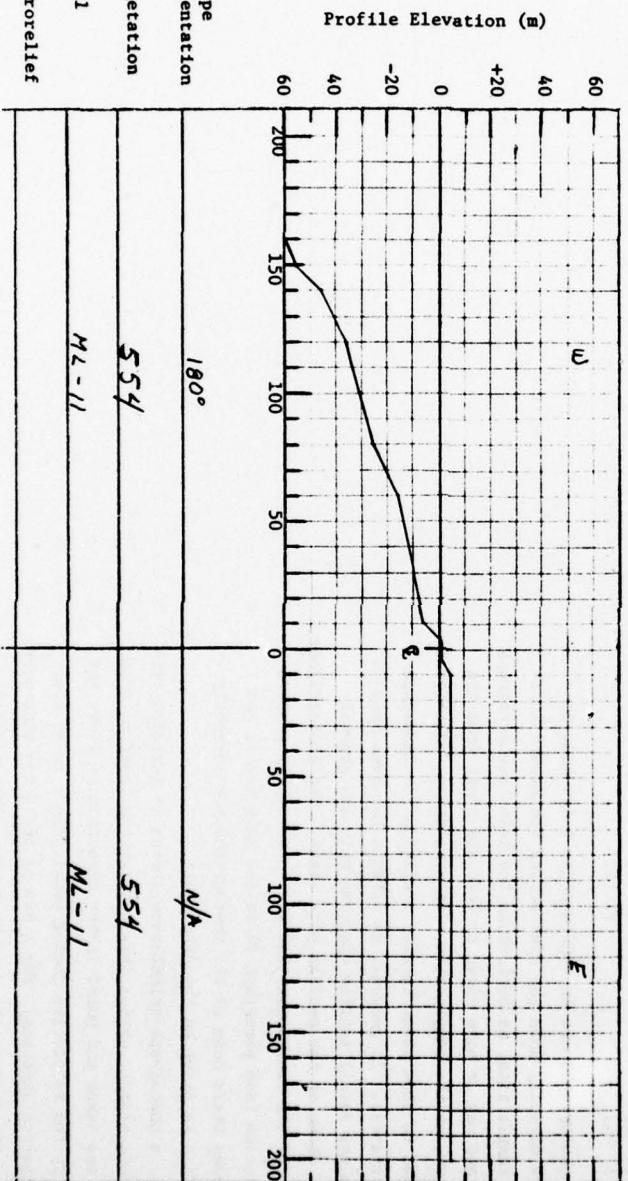
Width (m)	Traffic Surface	Shoulder Material
	Material	Thickness (cm)
	Surface	
	Base	
	Subbase	

Horizontal Distance (m)

W

E

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation: 180° N/A

Vegetation: 554

Soil: ML-11

Microrelief

Sample Number: 2

Date: 28 Aug 74

Map Number: 14418

Scale: 1:50000

Coordinate Location:

Geographic: 51°12'21"N
08°55'20"E

Landscape: Forested upland

Road: Class: 4

Direction: E

Site Type: 2

Notes and Comments:

Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Material	Thick (cm)	Base		
Subbase					

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)



Profile Elevation (m)

60
40
20
0
-20
-40
-60

Slope Orientation

55°
180°

Vegetation

555
555

Soil

ML-11
ML-11

Microrelief

Sample Number: 3

Date: 28 Aug 74

Scale: 1:50000

Map Number: L 4918

UTM Ref.:

Coordinate Location: Geographic: 51°11'21"N 08°55'00"E

Landscape: Cultivated floodplain

Road: Class: 3 Direction: NNE Site Type: 2

Notes and Comments:

Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Material	Thick (cm)	Base		
Subbase					

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



NW

SE

Slope Orientation

180°

90°

Vegetation

2XX

545

Soil

ML-3

ML-3

Microrelief

SITE 3 - PROFILE DATA

A4

Sample Number: 4

Date: 29 Aug 74

Notes and Comments:

Map Number: L-4920 Scale: 1:50000

Coordinate Location:

Geographic: $51^{\circ}09'08''$ NUTM Ref.:

Landscape: Cultivated 1:1 slope

09° 15' 12" E

Road: Class: 5

Direction: NW Site Type: 2

Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Surface	Base	Subbase		

Horizontal Distance (m)



Instruction:

On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation

180°

Vegetation

2XX

Soil

ML-5

Microrelief

Sample Number: 5

Date: 29 Aug 74

Notes and Comments:

Map Number: L 4420

Scale: 1:50000

Coordinate Location:

Geographic: 51°10'0" N UTM Ref.:

Landscape: Cut bank gently sloping

09°16'58"E

Road: Class: 3

Direction: E

Site Type: 4

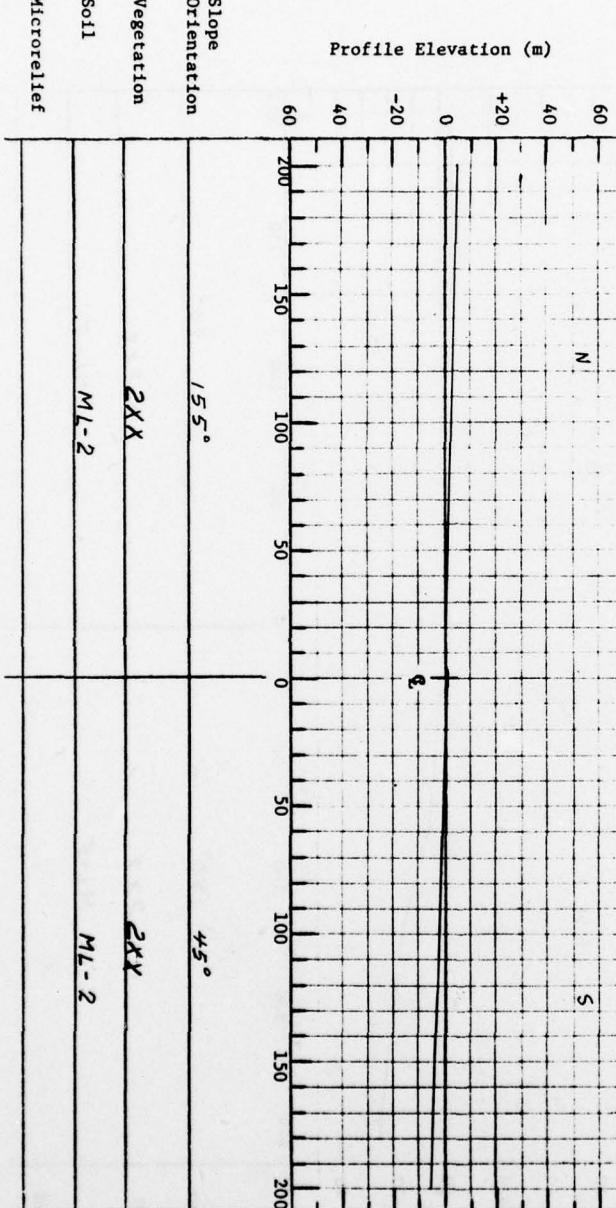
Construction:

Width (m)	Traffic Surface		Shoulder Width (m)	Material
	Surface	Base		
Subbase				

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Profile Elevation (m)



Slope Orientation: 155°

Vegetation: 2XX

Soil: ML-2

Microrelief

Sample Number: 6

Date: 29 Aug 74

Map Number: L 4920 Scale: 1:50000

Coordinate Location: Geographic: 51° 11' 19" N UTM Ref.:

Landscape: *Cultivated lowland*

09° 18' 54" E

Road: Class: 2 Direction: NE Site Type: 4

Notes and Comments:



Construction:

Width (m)	Traffic Surface			Shoulder Material
	Surface	Thick (cm)	Width (m)	
Subbase				

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Profile Elevation (m)

Horizontal Distance (m)

Slope Orientation 45° 180°

Vegetation 2XX

Soil ML-2

Microrelief

SITE 6 - PROFILE DATA

Sample Number: 7

Date: 29 Aug 74

Notes and Comments:

Map Number: L 4922 Scale: 1:50000

Coordinate Location: Geographic: 51°09'00" N UTM Ref.: 09°35'54"E

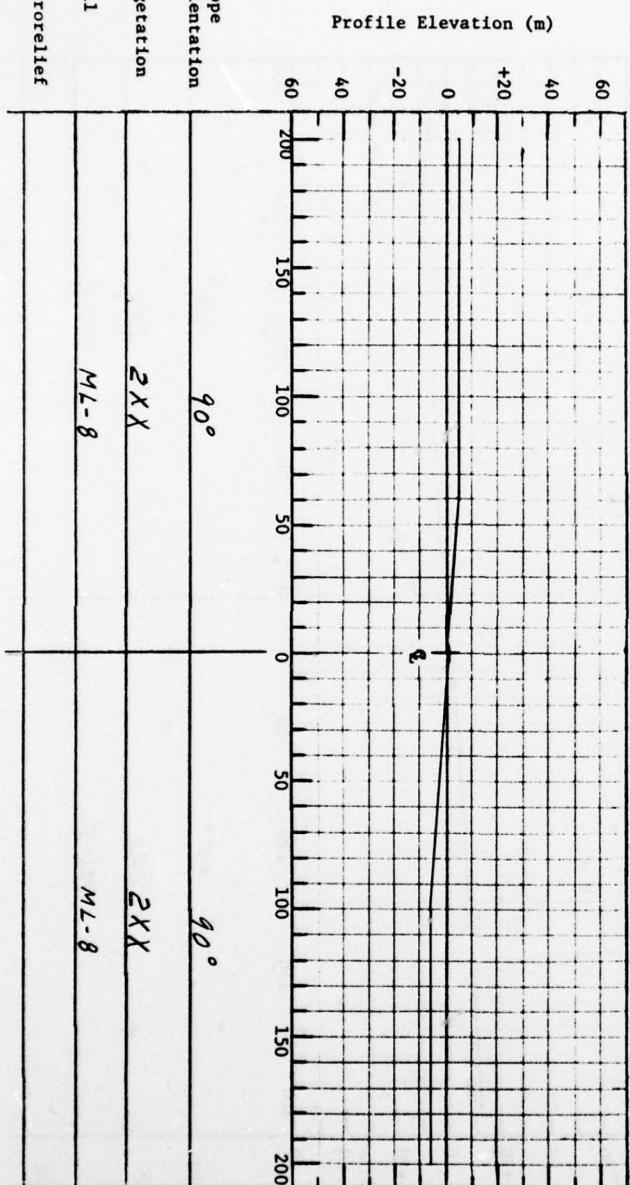
Landscape: Cut/Hilled h. 1/1 side

Road: Class: 5 Direction: NW Site Type: 4

Construction:

Width (m)	Traffic Surface		Shoulder Width (m)	Material
	Surface	Base		
Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



SITE 7 - PROFILE DATA
A8

Sample Number: 8

Date: 30 Aug 74

Notes and Comments:

Map Number: L 4492

Scale: 1:50000

Coordinate Location:

Geographic: $51^{\circ}09'00''N$ UTM Ref.:

Landscape: ~~Cultivated field/plain/forest~~
~~hillsides~~ 09 $^{\circ}$ 37'00''E

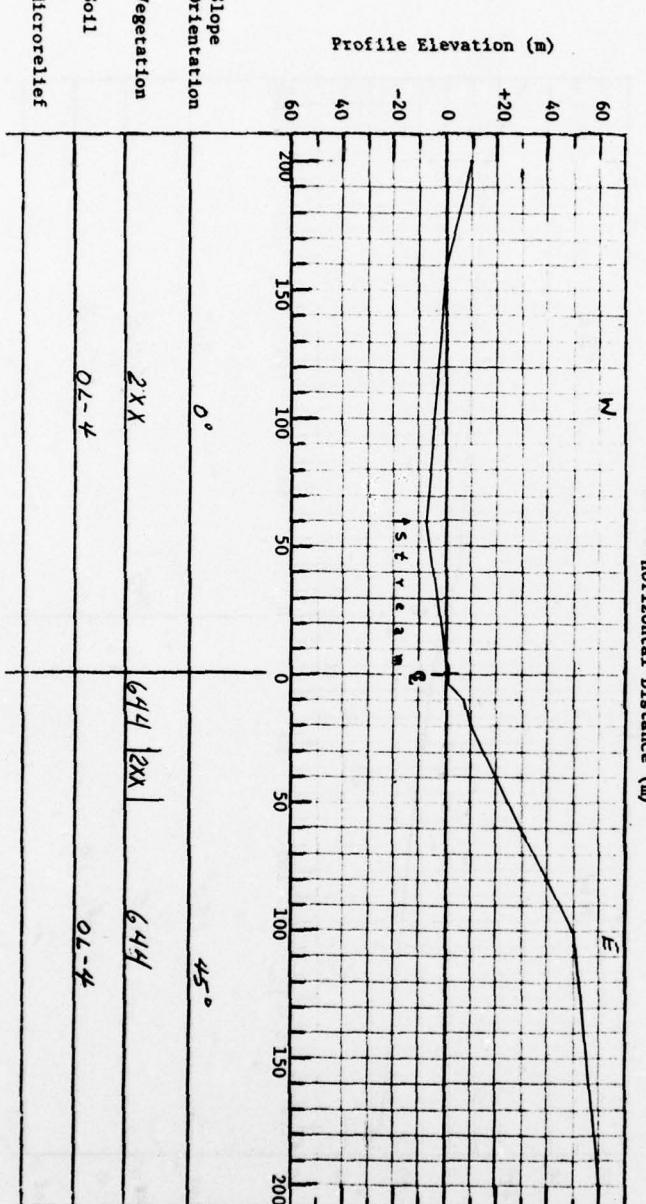
Road: Class: 3

Direction: N

Site Type: 2

Construction:	Traffic Surface				Shoulder
Width (m)	Material	Thick (cm)	Width (m)	Material	
Surface					
Base					
Subbase					

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation

0°

45°

Vegetation

XX

644

644

Soil

0L-4

Microrelief

Notes and Comments:

Sample Number: 9

Date: 30 Aug 74

Map Number: L4422

Scale: 1:50000

Coordinate Location:

Geographic: $51^{\circ}09'00''N$ UTM Ref.:
 $09^{\circ}38'57''E$ Landscape: *Terrified upland*

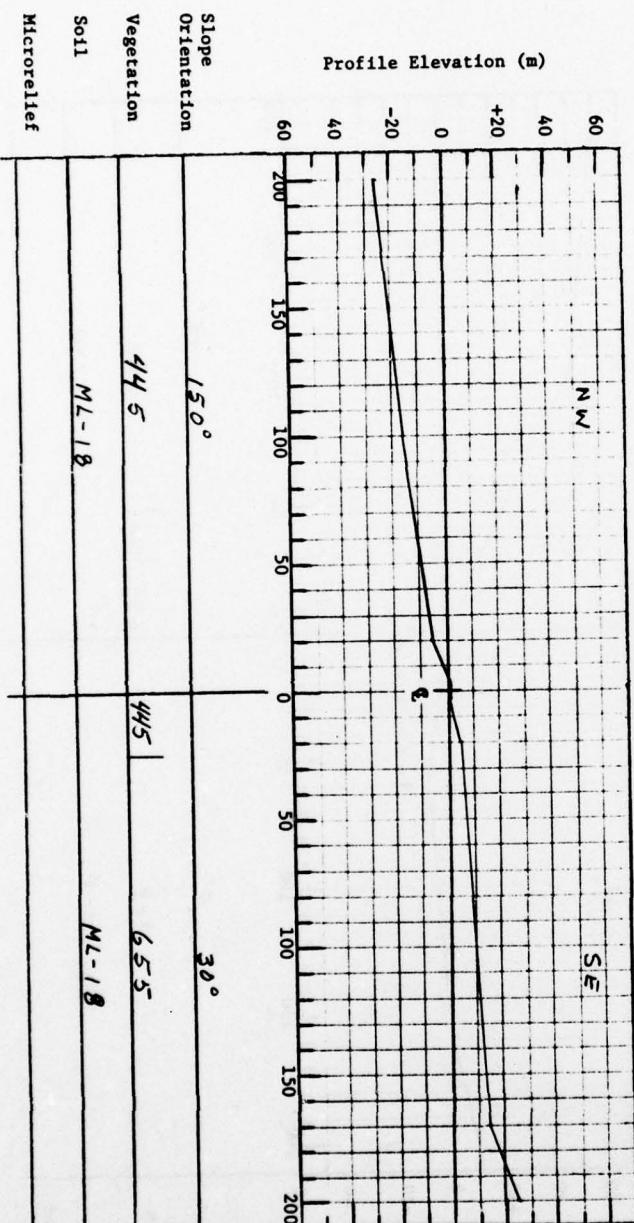
Road: Class: 4 Direction: NE Site Type: 4

Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Surface	Material	Thick (cm)		
Subbase					

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



SITE 9 - PROFILE DATA
ALO

Sample Number: 10

Date: 30 Aug 74

Notes and Comments:

Map Number: L 516

Scale: 1:50000

Coordinate Location:

Geographic: 50°56'14"N 93°34'51"E

Landscape: Farmland & cultivated w/ly

Road: Class: 4

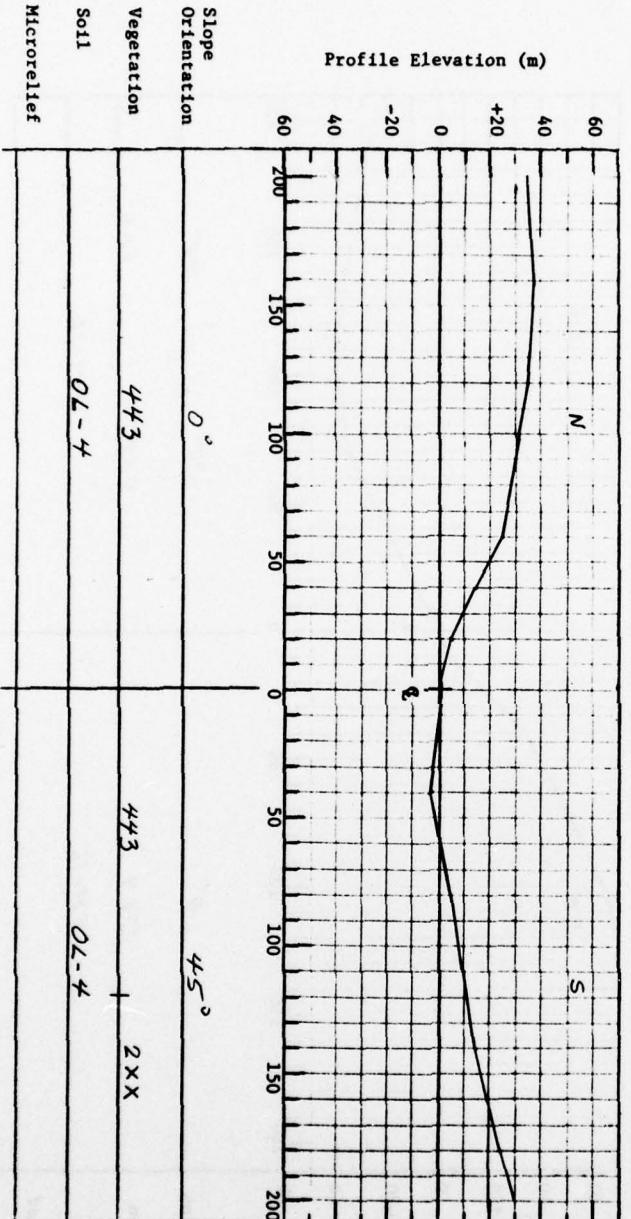
Direction: E

Site Type: 3

Construction:		Traffic Surface	Material	Thick (cm)	Shoulder	Width (m)	Material
Width (m)		Surface			Base		Subbase

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



SITE 10 - PROFILE DATA
All

Sample Number: 11

Map Number: L 5116 Scale: 1:50000

Date: 30 Aug 74

Notes and Comments:

Coordinate Location: Geographic: 50°56'43"N UTM Ref.: 08°35'00"E

Landscape: Forested valley

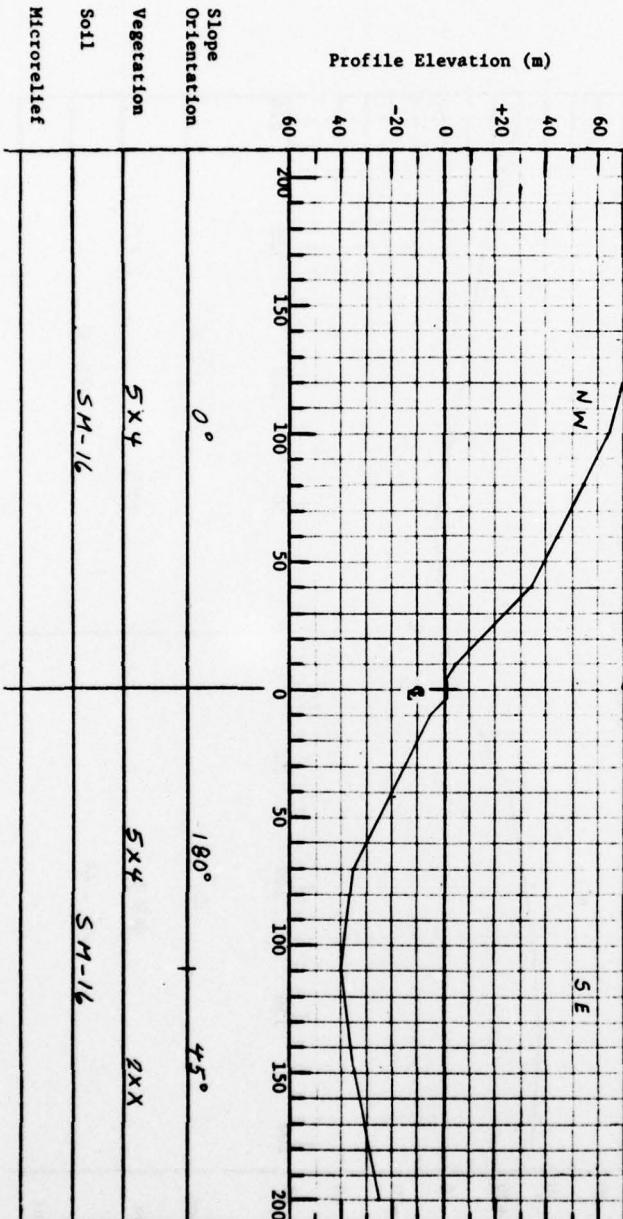
Road: Class: 5 Direction: NE Site Type: 5/3

Construction:

Width (m)	Traffic Surface			Shoulder Material
	Surface	Material	Thick. (cm)	
Base			(m)	
Subbase				

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation

Vegetation

Soil

Microrelief

0° 180° 45°

5x4 5x4 ZX

SM-16 SM-16

Sample Number: 12

Date:

Map Number: L 5116

Scale: 1:50000

Coordinate Location:

Geographic: 50°56'14"N UTM Ref.:

Landscape: C/Hilly & forested valley

Road: Class: 2

Direction: NW

Site Type: 3

Notes and Comments:



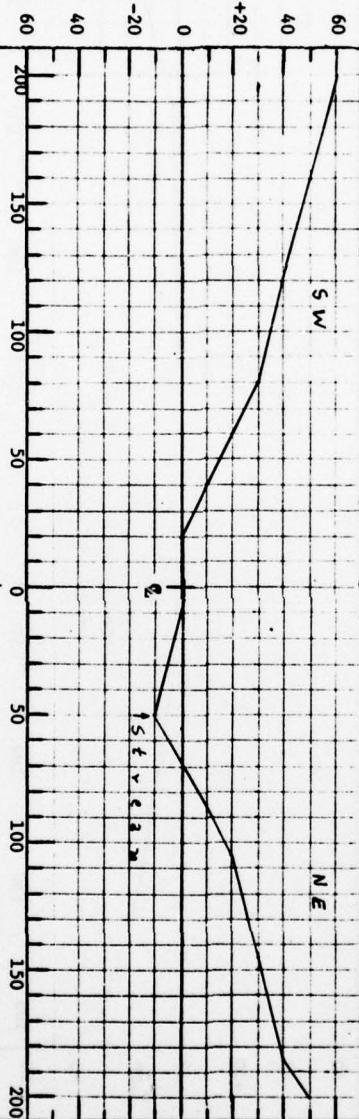
Construction:

Width (m)	Traffic Surface			Shoulder	
	Material	Thick (cm)	Width (m)	Material	
Base					
Subbase					

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Profile Elevation (m)



Slope Orientation

0°

Vegetation

2xx

Soil

0L-4

Microrelief

443

Sample Number: 13

Date: 30 Aug 74

Notes and Comments:

Map Number: L5118

Scale: 1:50000

Coordinate Location:

Geographic: 50°57'12"N UTM Ref.:

Landscape: ~~Forested~~ ~~open~~

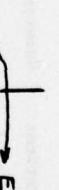
08°55'20"E

Road: ~~Forest~~ ~~open~~

Class: 5

Direction: E

Site Type: 2



Construction:

Width (m)	Traffic Surface			Shoulder (m)	Material
	Surface	*	Base		
Subbase					

* DIRT farm road w/ cobbles less than 10 cm diam.

Horizontal Distance (m)

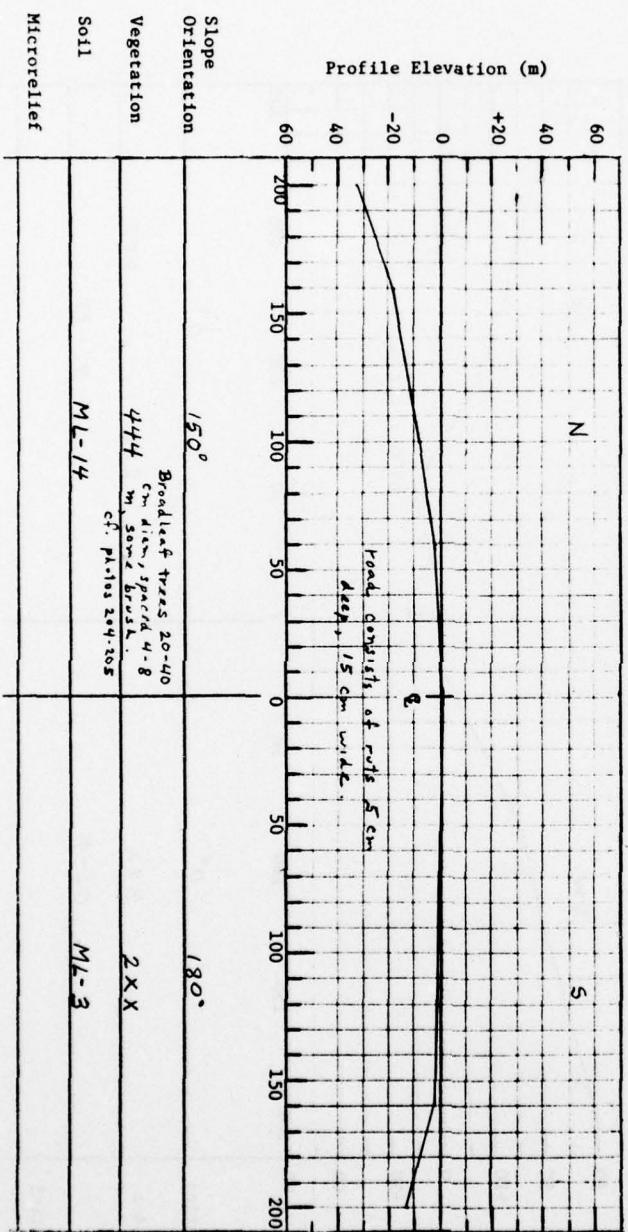
Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

N

S

E

Profile Elevation (m)



Slope Orientation

Vegetation

Soil

Microrelief

Broadleaf trees 20-40 cm diam., spaced 4-8 m. Some brush.

444 c.f. ph-10s 204-205

ML-14

ML-3

Sample Number: 14

Date: 30 Aug 74

Notes and Comments:

Map Number: L 5118

Scale: 1:50,000

Coordinate Location:

Geographic: $50^{\circ}57'39''N$ UTM Ref.:

Landscape: Cut Husted valley

$08^{\circ}56'13''E$

Road: Class: 3

Direction: NW

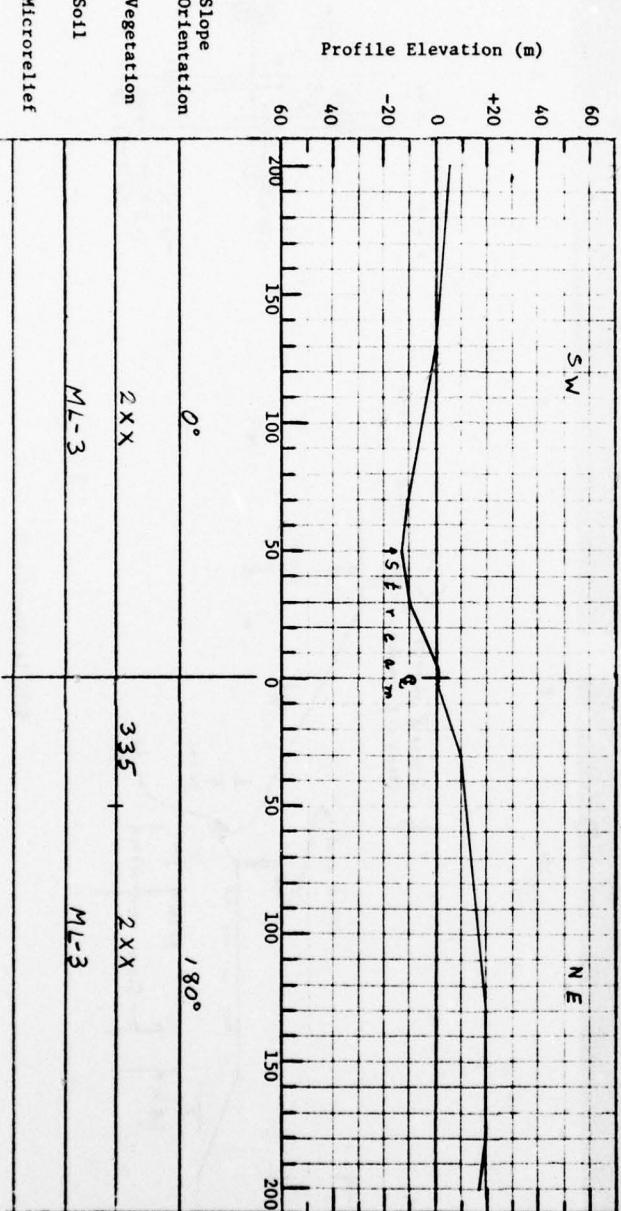
Site Type: 3/2

Construction:

Width (m)	Traffic Surface		Shoulder Material
	Surface Blanket	Base	
* 5.5			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m) * from field observation, Aug 1974



Slope Orientation

0° / 80°

Vegetation

2 XX

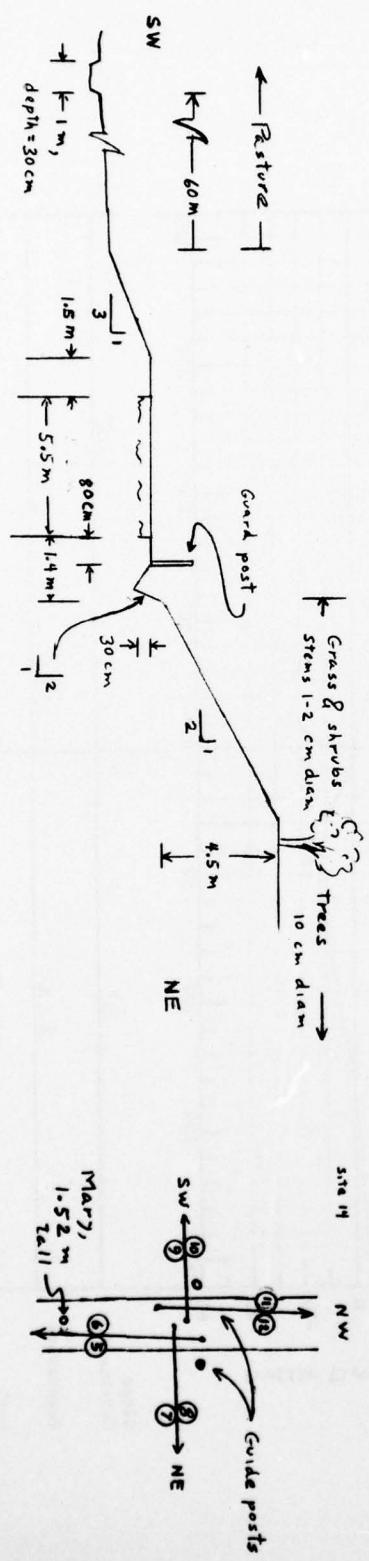
3 3 5

2 XX

Soil

ML-3

Microrelief



SITE 14 (Sheet 1 of 2)

A16

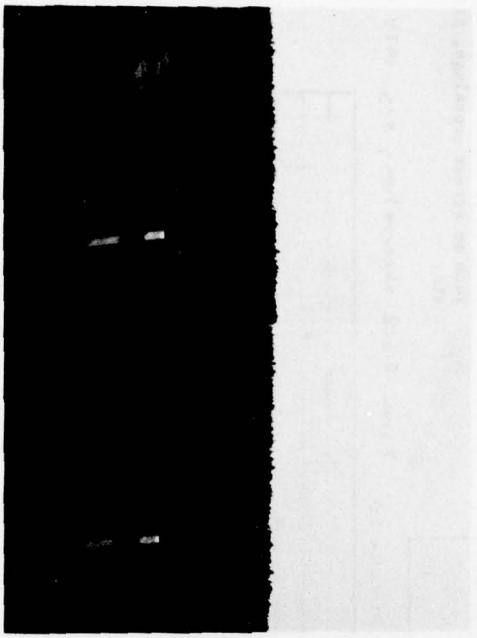


11

12

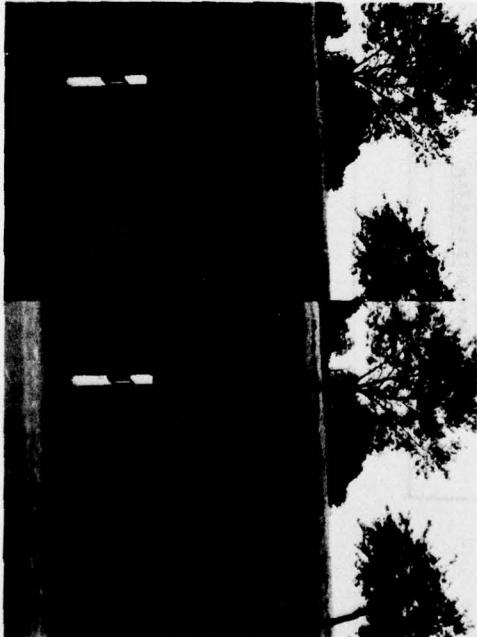
5

6



9

10



8

7

SITE 14 (Sheet 2 of 2)

Sample Number: 15

Map Number: L5118 Scale: 1:50000

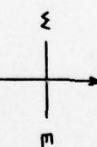
Coordinate Location: Geographic: 50°58'56" UTM Ref.:

Landscape: Pasture & cultivated ~~Jungle~~ plain 08°58'20"

Road: Class: 2 Direction: N Site Type: 1

Notes and Comments:

Date: 30 Aug 74



Construction:

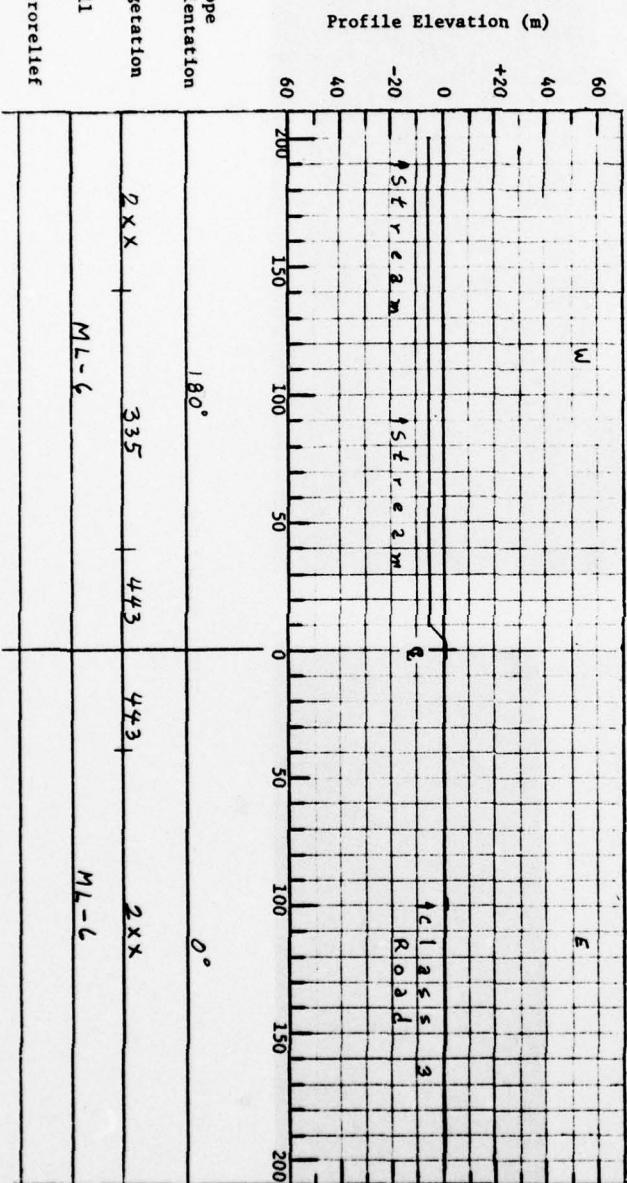
Width (m)	Traffic Surface		Shoulder Width (m)	Material
	Surface *	Base		
* 8	Blacktop			
Subbase				

Horizontal Distance (m)

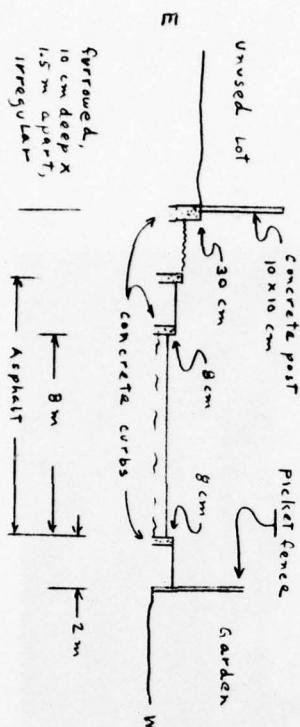
Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

* from field observation, Aug. 1974

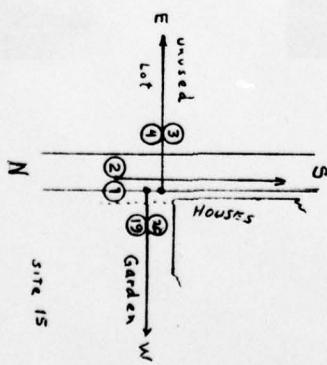
Class 3 Road

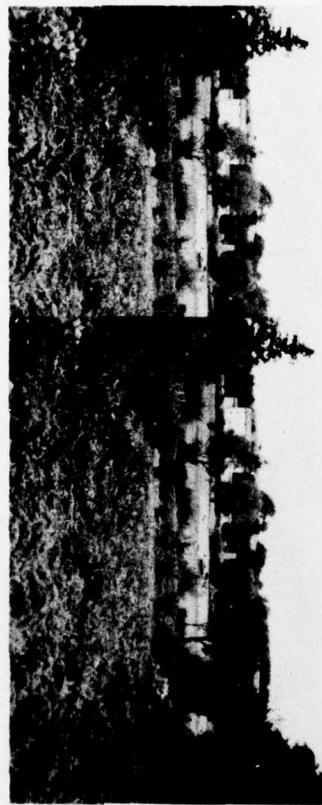


SITE 15 - PROFILE DATA
A18



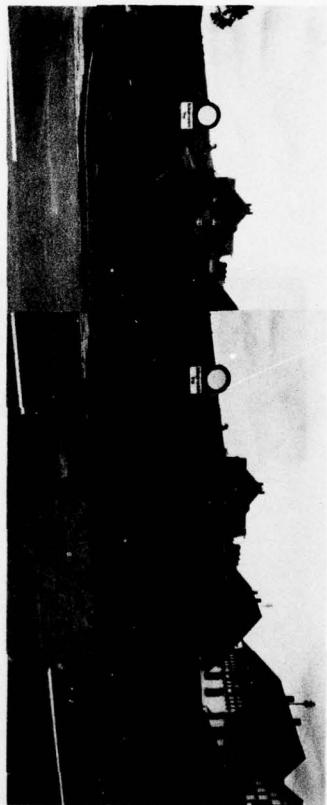
SITE 15 (Sheet 1 of 2)





20

19



4

3

SITE 15 (Sheet 2 of 2)

A20

Sample Number: 16

Date: 30 Aug 74

Notes and Comments:

Map Number: L 5118 Scale: 1: 50000

Coordinate Location: Geographic: $50^{\circ}59'52''N$ UTM Ref.: $08^{\circ}59'51''E$

Landscape: Forested hillside

Road: Class: 2.5 Direction: N Site Type: 4



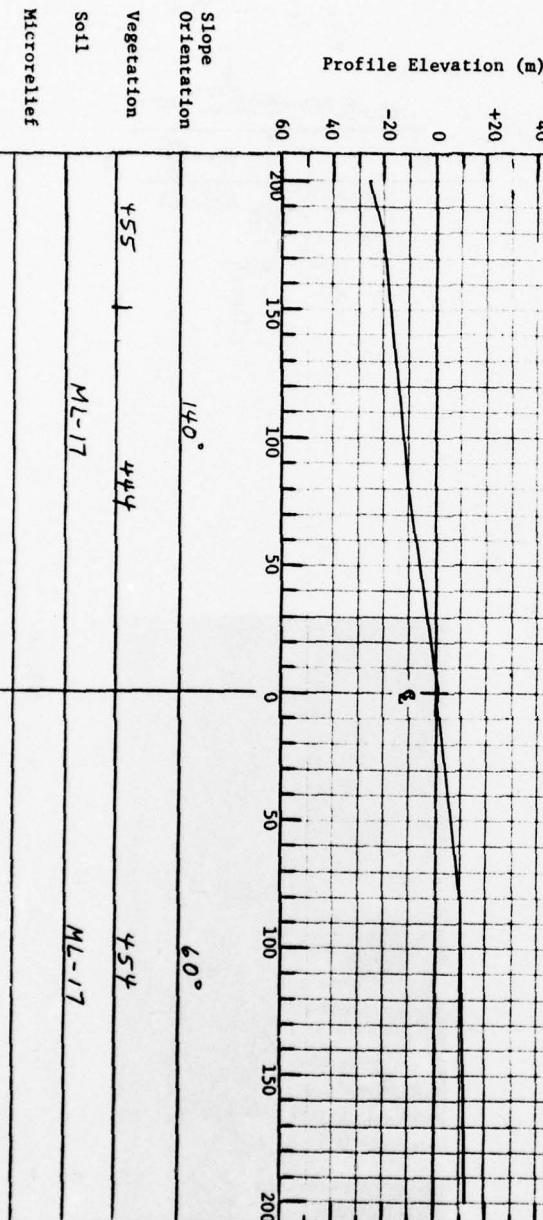
Construction:

Width (m)	Traffic Surface		Shoulder	
	Material	Thick (cm)	Width	Material
*	4	metalled	1.5m	

Horizontal Distance (m)

* From field observation, Aug 1974

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

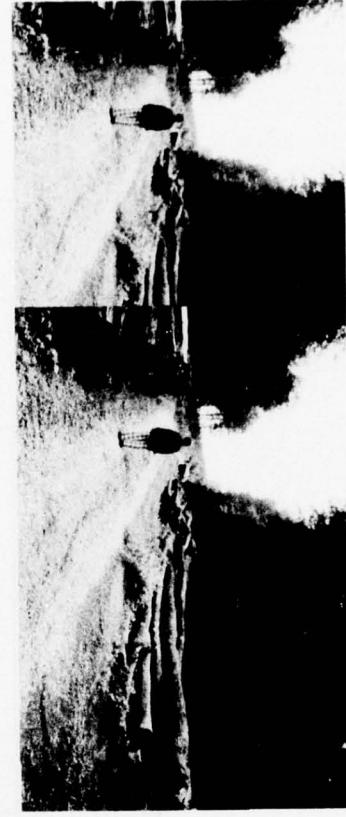




16

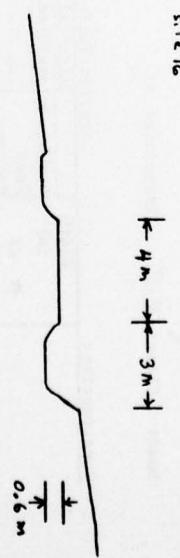
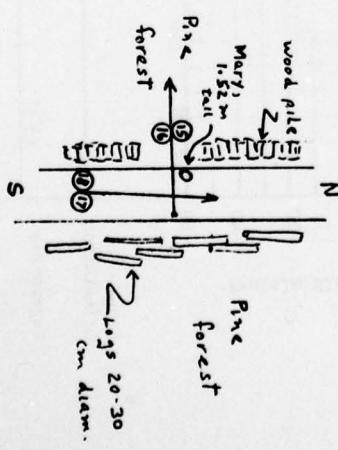
15

SITE 16



18

17



A22

Sample Number: 17

Date: 3 Sept 74

Notes and Comments:

Map Number: L 5120 Scale: 1:50000

Coordinate Location: Geographic: 50°57'00"N UTM Ref.:

Landscape: Wooded & cultivated open land

Road: Class: 4 Direction: NE Site Type: /

09°15'40"E

NW
NE

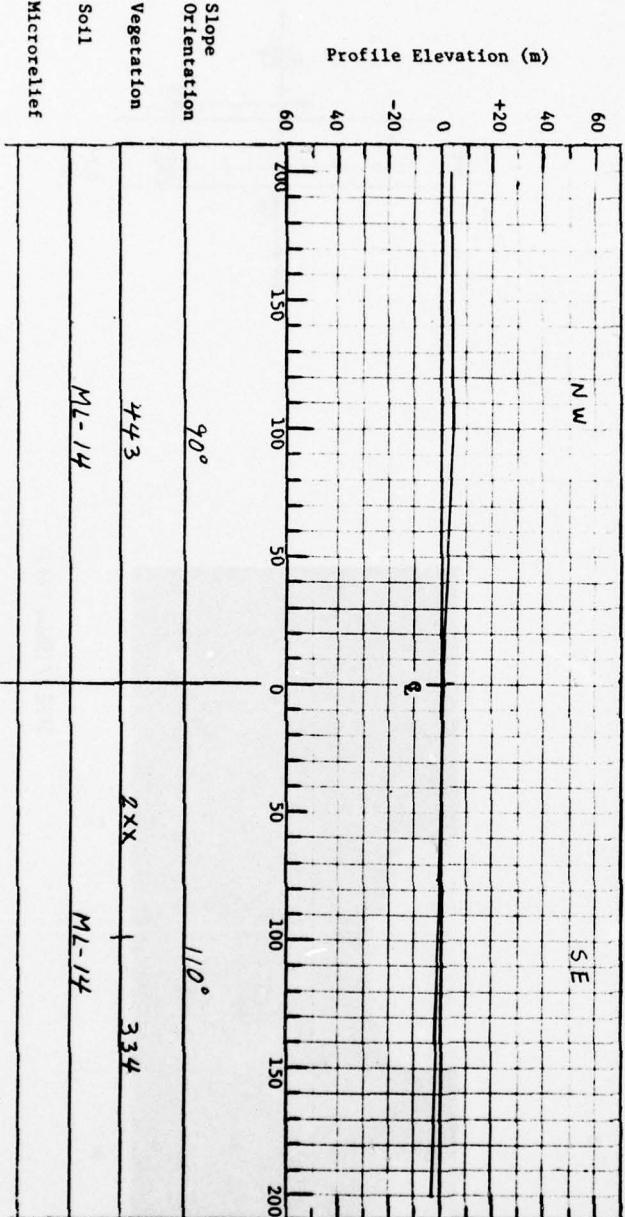
NW
SE

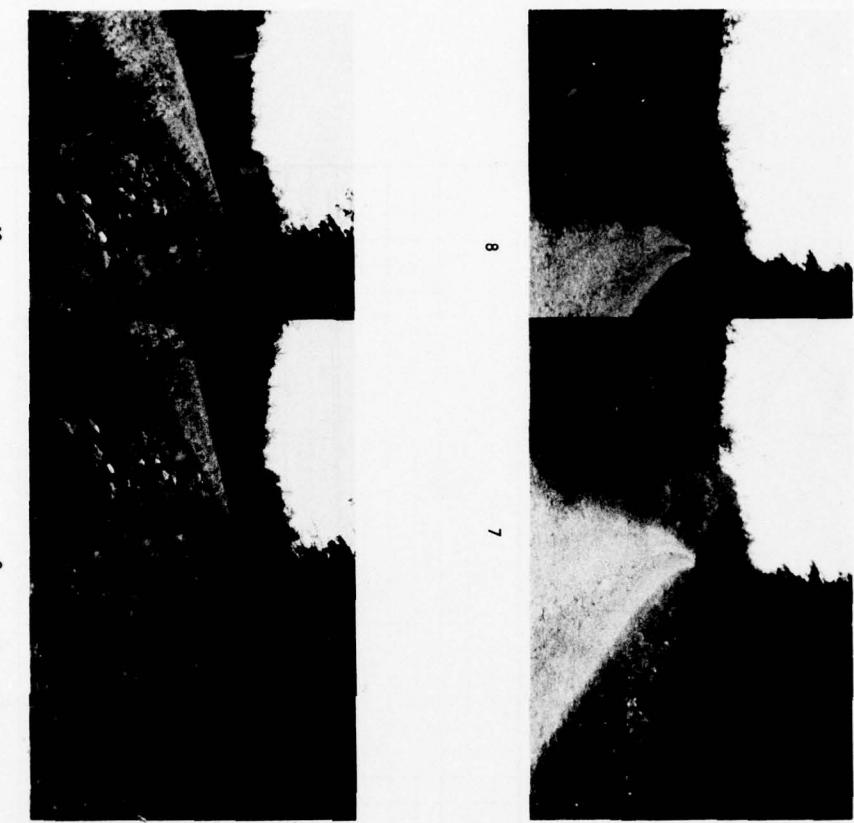
Construction: Traffic Surface Shoulder

Width (m)	Traffic Surface Material	Thickness (cm)	Shoulder Width (m)	Shoulder Material
*	Metalized			
5				
Base				
Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

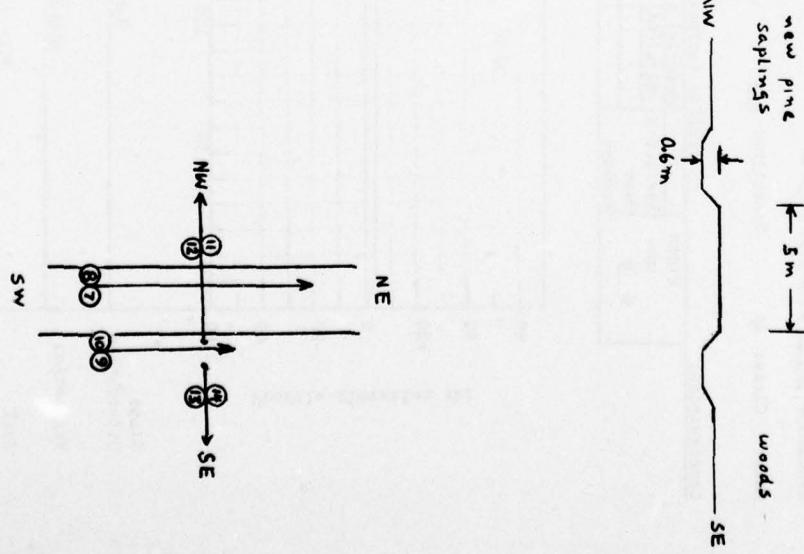
* From field observation, Aug 1974.





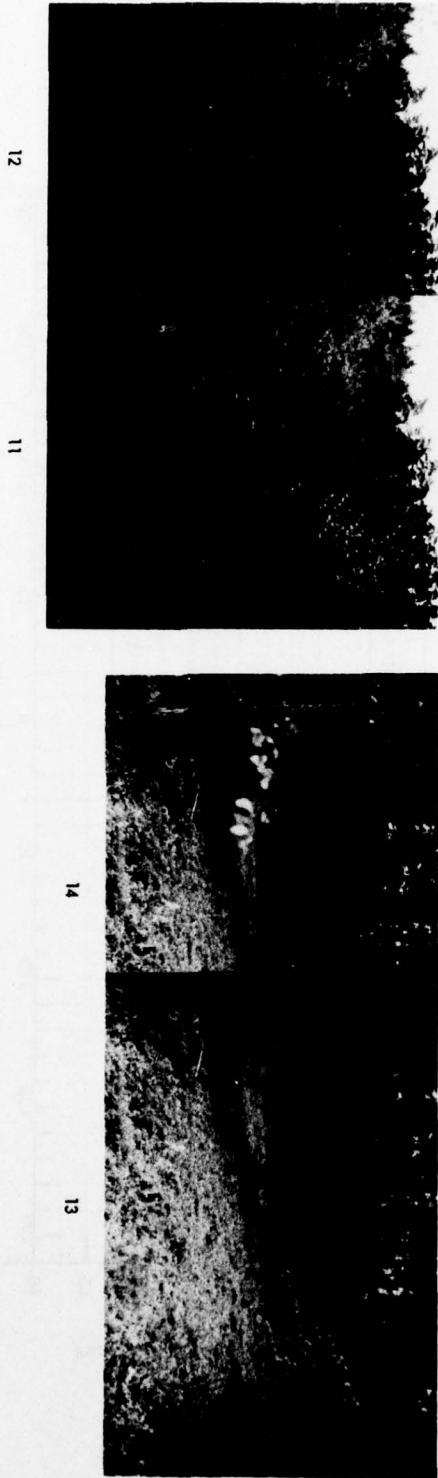
SITE 17 (Sheet 1 of 2)

A24



A25

SITE 17 (Sheet 2 of 2)



14

13

Sample Number: 18

Date: 3 Sept 74

Map Number: L5120

Scale: 1:50000

Coordinate Location: Geographic: $50^{\circ}57'00''N$ $09^{\circ}16'25''E$

Landscape: Forested hills, some cultivation

Road: Class: 5 Direction: NW Site Type: 4

Notes and Comments:

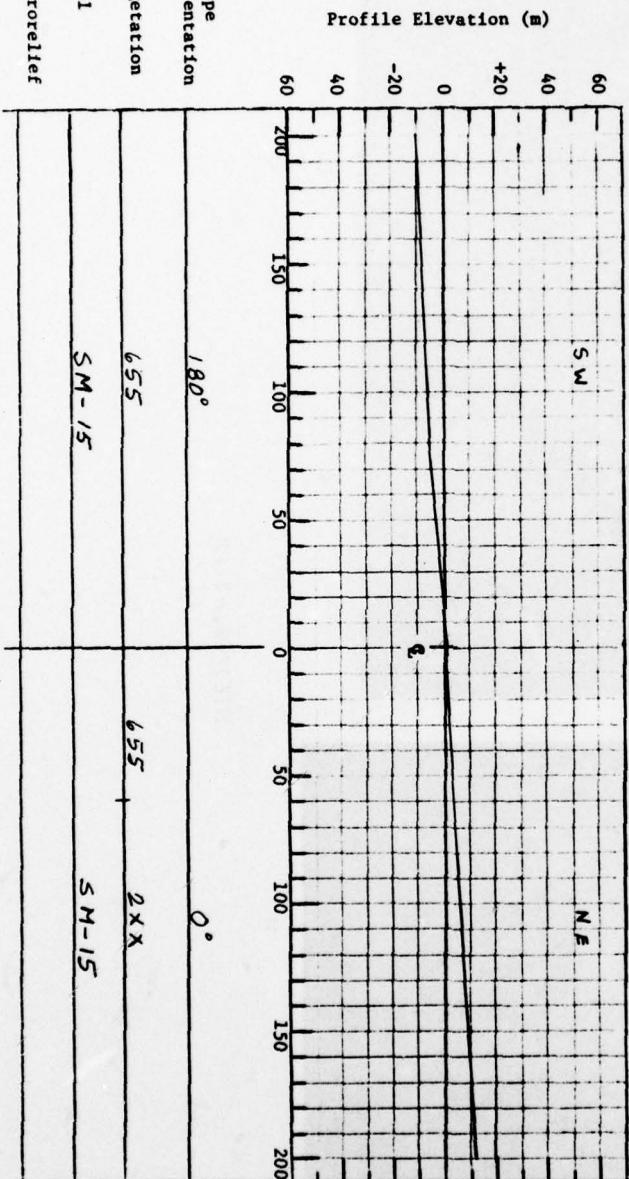


Construction:

Width (m)	Traffic Surface		Shoulder Material
	Surface *	Material	
4	Gravel	Gravel	
	Base		
	Subbase		

* from field observation, 4-3 1974

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation

180°

Vegetation

0°

Soil

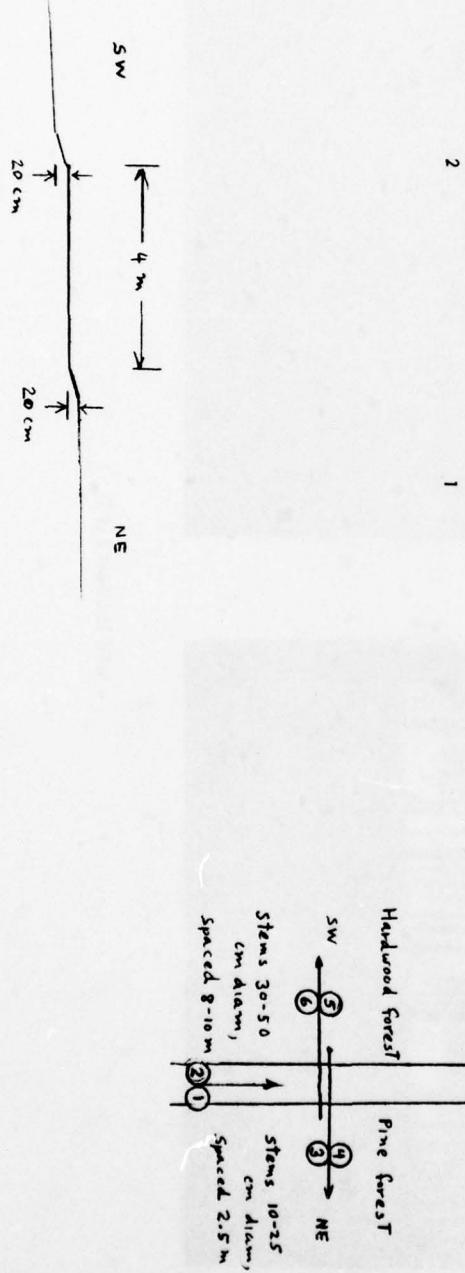
655

Microlief

655

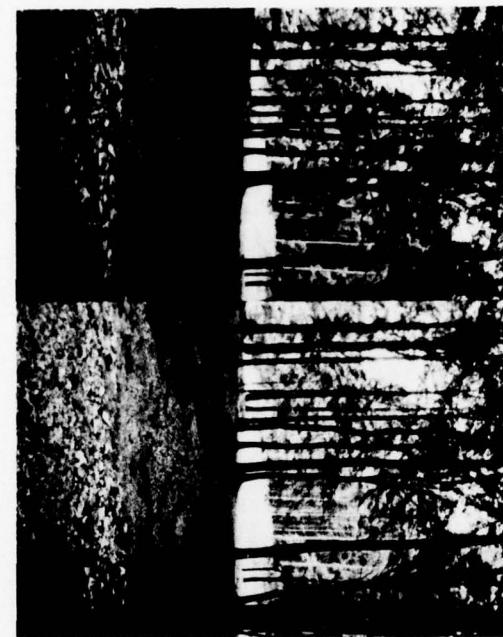
SM-15

SM-15



SITE 18 (Sheet 1 of 2)

A27



6

5

SITE 18 (Sheet 2 of 2)



4

3

Sample Number: 19

Date: 3 Sept 74

Map Number: L 5120

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}57'00''N$ UTM Ref.:
 $091742'E$

Landscape: Cultivated & weeded/
"optimal"

Road: Class: 2

Direction: NE

Site Type: 1

Notes and Comments:

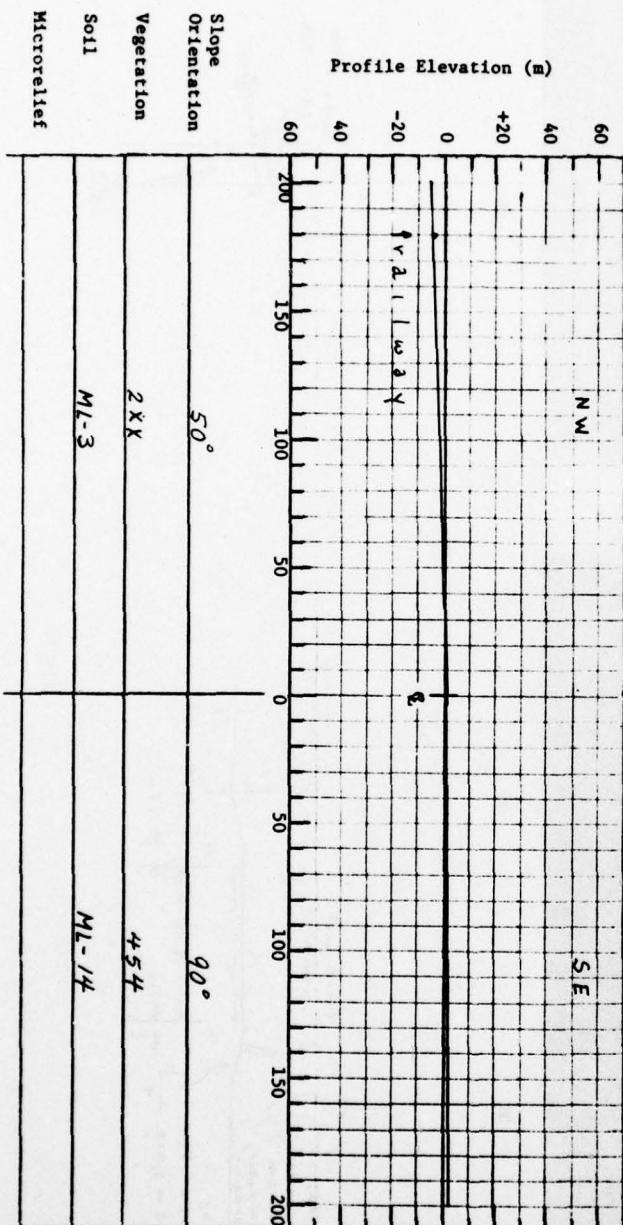


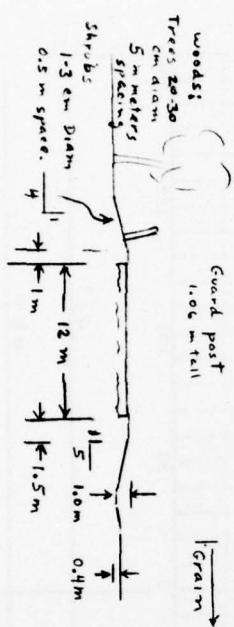
Construction:

Width (m)	Traffic Surface		Shoulder Width (m)	Material
	Surface *	Material		
* 12	Blacktop			
Base				
Subbase				

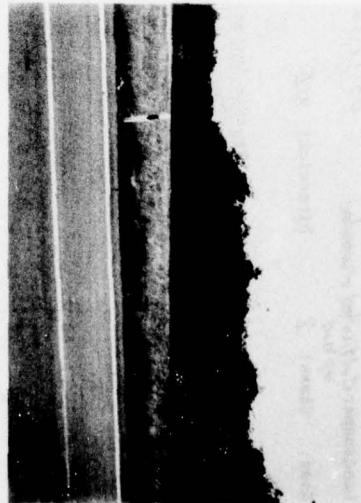
Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

* field observation, Aug 1974

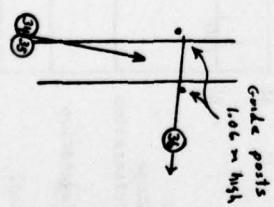




35



36



SITE 19

A3C

Sample Number: 20

Date: 3 Sept 74

Notes and Comments:

Map Number: 5023

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}57'03''N$ UTM Ref.:
 $09^{\circ}35'07''E$

Landscape: *Fores* / hill

Road: Class: 5

Direction: NE Site Type: 2

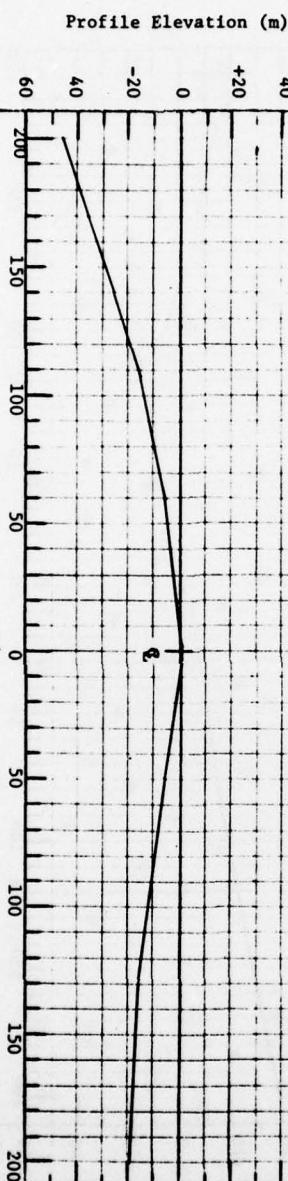
Construction:

Width (m)	Traffic Surface Material	Thickness (cm)	Width (m)	Shoulder Material
Base				
Subbase				

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Profile Elevation (m) SW NE



Slope Orientation

0° 40°

Vegetation

5XX 4XX

Soil

SM-10 SM-10

Microrelief

Sample Number: 21

Date: 3 Sept 74

Notes and Comments:

Map Number: 5023

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}58'14''N$ UTM Ref.:
 $09^{\circ}37'17''E$

Landscape: Cuyahoga Valley National Park

Road: Class: 2

Direction: NE

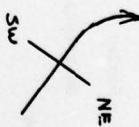
Site Type: 3

Construction:

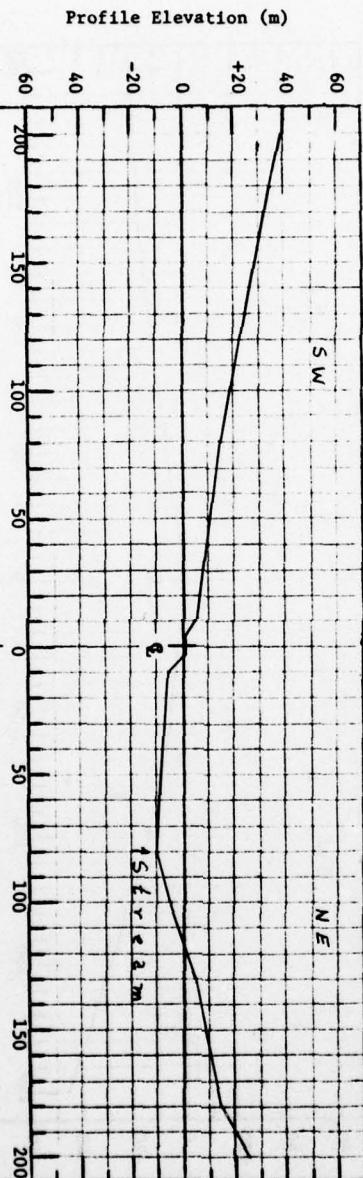
Width (m)	Traffic Surface Material	Thickness (cm)	Width (m)	Shoulder Material
* 4.8	Blacktop			
	Base			

Horizontal Distance (m)

* From field observation, Aug 1974



Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation

0°

20°

Vegetation

2XX

2XX

6XX

Soil

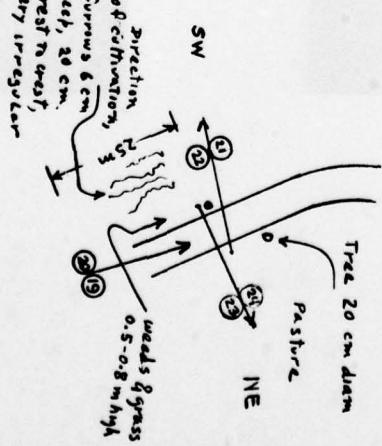
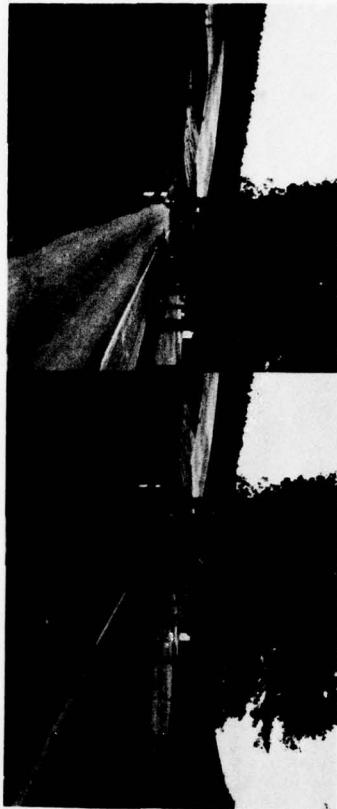
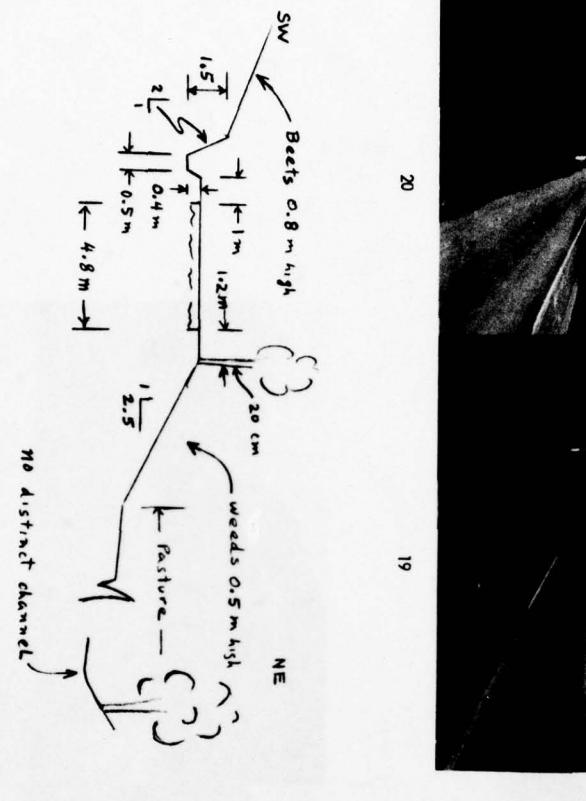
OL-4

(* clay soil, with
OL-4)

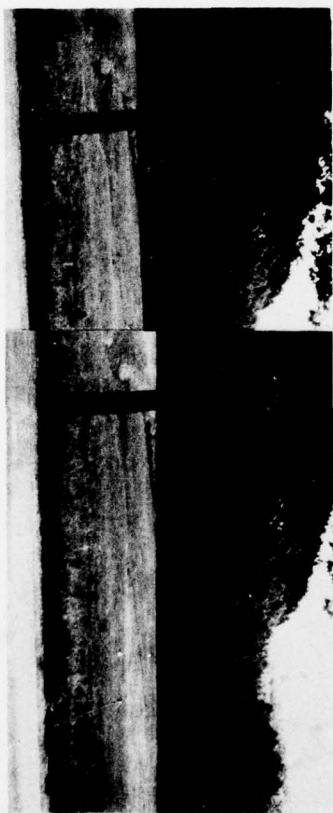
Microrelief

many angular

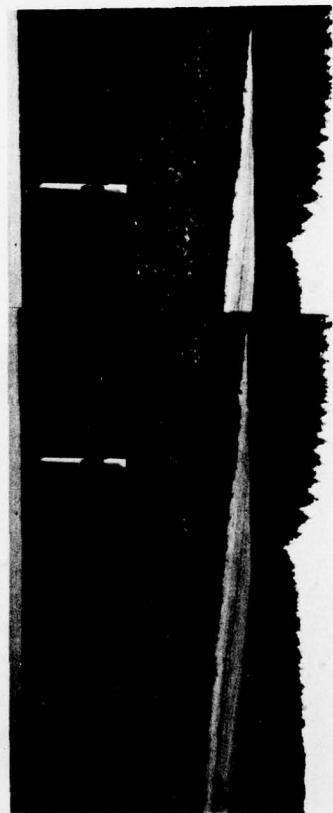
stone chips less than 4 cm diam.)



SITE 21 (Sheet 1 of 2)



24



22

23

SITE 21 (Sheet 2 of 2)

A34

Sample Number: 22

Date: 3 Sept 74

Notes and Comments:

Map Number: 5023 Scale: 1:25000

Coordinate Location: Geographic: 50°59'05"N UTM Ref.: 09°38'28"E

Landscape: Forested hill

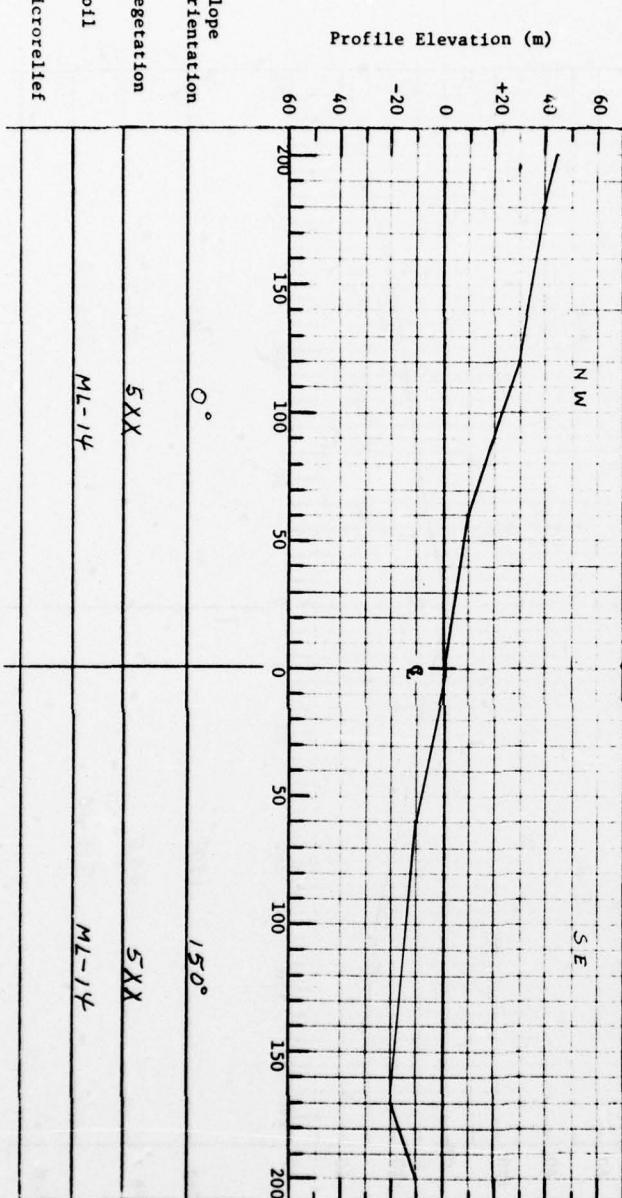
Road: Class: 4 Direction: NE Site Type: 3

Construction:

Width (m)	Traffic Surface Material	Thickness (cm)	Shoulder Width (m)	Material
0				
Subbase				

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



SITE 22 - PROFILE DATA

Sample Number: 23

Date: 3 Sept 74

Notes and Comments:

Map Number: 5025

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}57'29''N$ UTM Ref.:

Landscape: Forested area

$09^{\circ}55'48''E$

Road: Class: 5

Direction: NW

Site Type: 2

Construction:

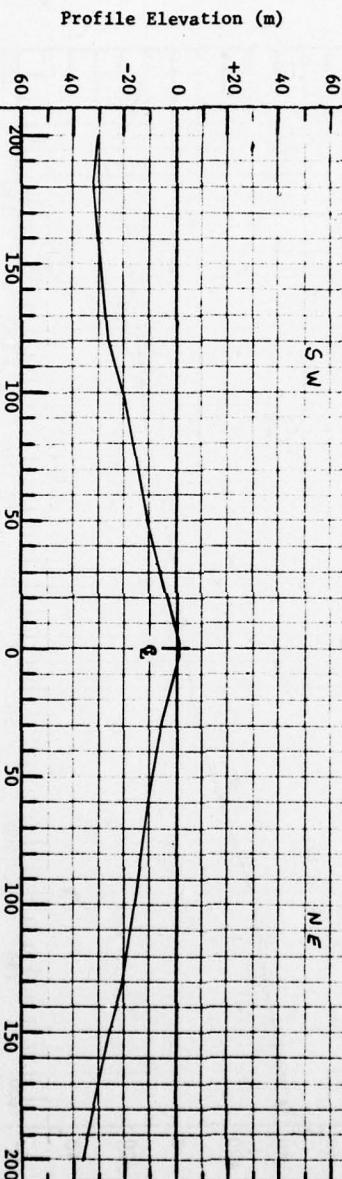
Width (m)	Traffic Surface	Material	Thickness (cm)	Width (m)	Shoulder Material
	Surface				
	Base				
	Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)

NW

NE



Slope Orientation

150° 180°

Vegetation

655 454

Soil

SM-10 SM-10

Microrelief

Sample Number: 24

Date: 3 Sept 74

Map Number: 5025

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}58'13''N$ UTM Ref.:
 $09^{\circ}57'02''E$

Landscape: *Forested valley*

Road: Class: 4

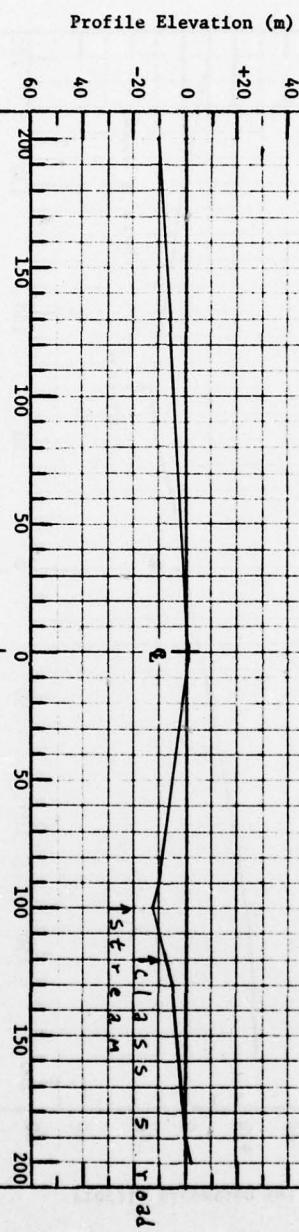
Direction: \angle Site Type: 2/3

Notes and Comments:

On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Construction:		Traffic Surface		Shoulder	
Width (m)	Material	Thick (cm)	Width (m)	Material	
Surface					
Base					
Subbase					

Horizontal Distance (m)



Slope Orientation

120°

Vegetation

442 442

Soil

ML-3 ML-3

Microrelief

Sample Number: 25

Date: 3 Sept 74

Notes and Comments:

Map Number: 5025

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}59'15''N$ UTM Ref.:

Landscape: Cut bank valley

Road: Class: 2 Direction: NW

Site Type: 3

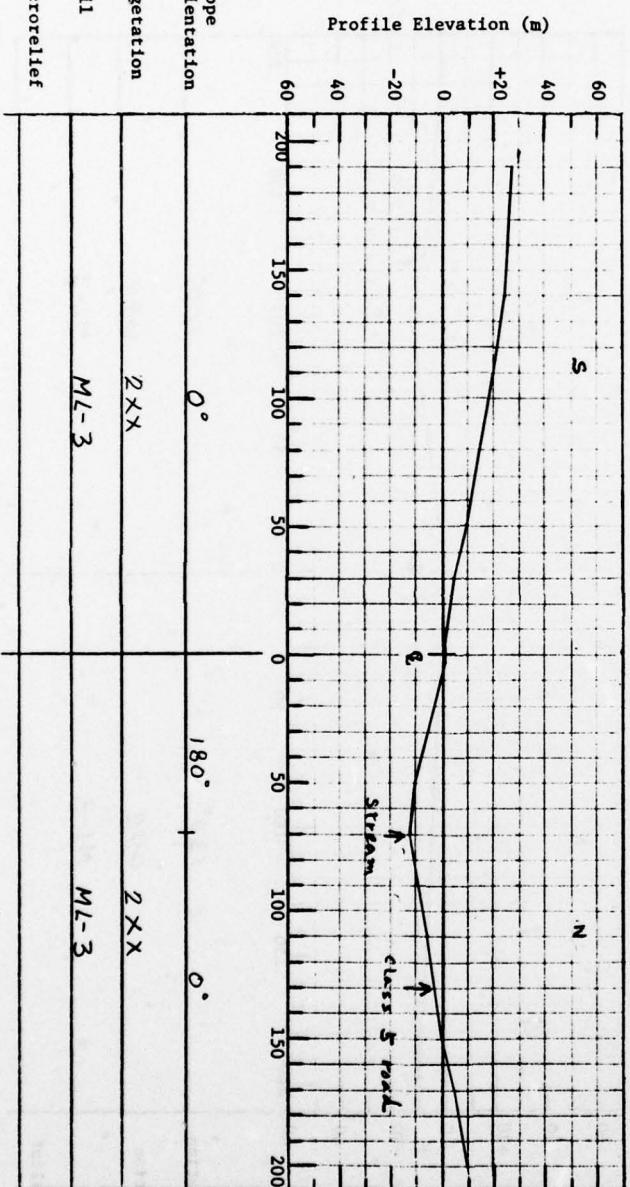
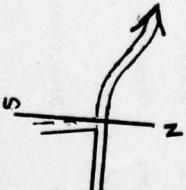
Construction:

Width (m)	Traffic Surface		Shoulder	
	Material	Thick (cm)	Width (m)	Material
* 10	Blacktop			

Width (m)	Traffic Surface		Shoulder	
	Material	Thick (cm)	Width (m)	Material
* 10	Blacktop			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

* from field observation, Aug 1974



Slope Orientation

0° 180° 0°

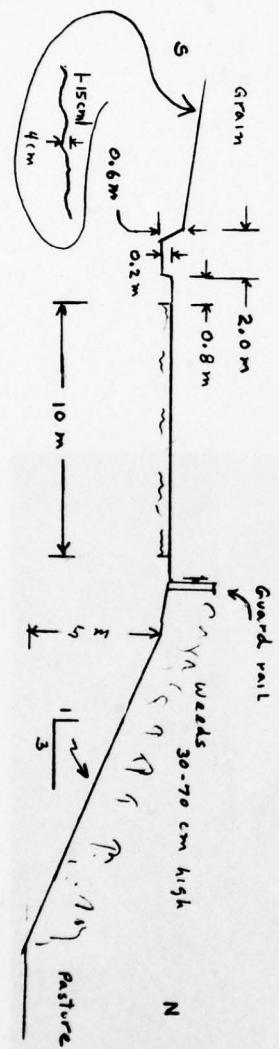
Vegetation

2XX 2XX

Soil

ML-3 ML-3

Microrelief



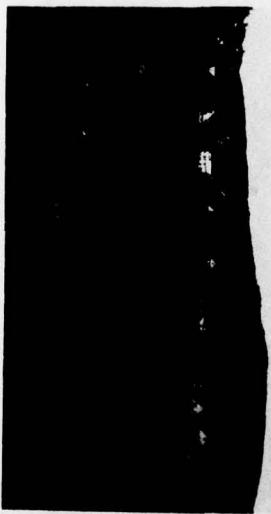
SITE 25 (Sheet 1 of 2)

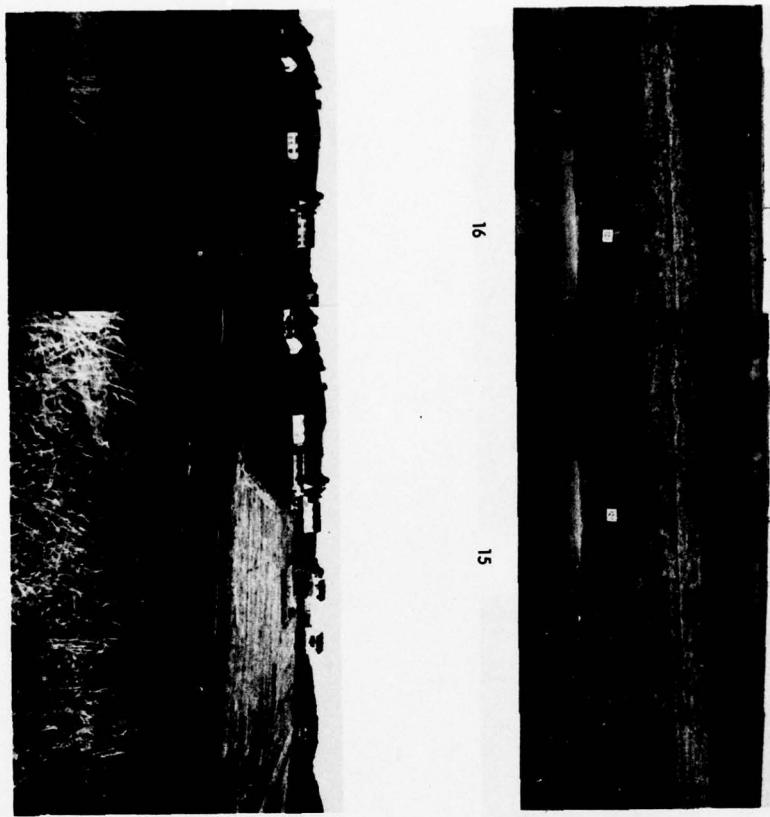
A39

11

12

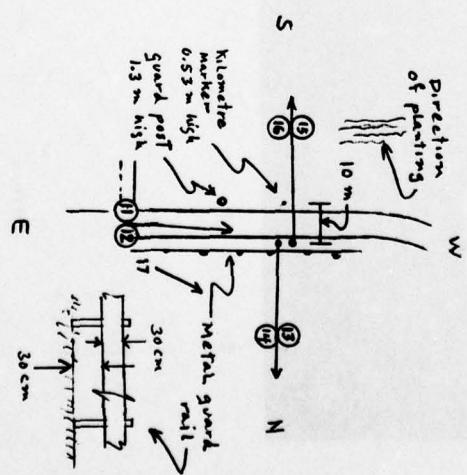
17





SITE 25 (Sheet 2 of 2)

A40



13

14

Sample Number: 26

Date: 3 Sept 74

Notes and Comments:

Map Number: L 5314

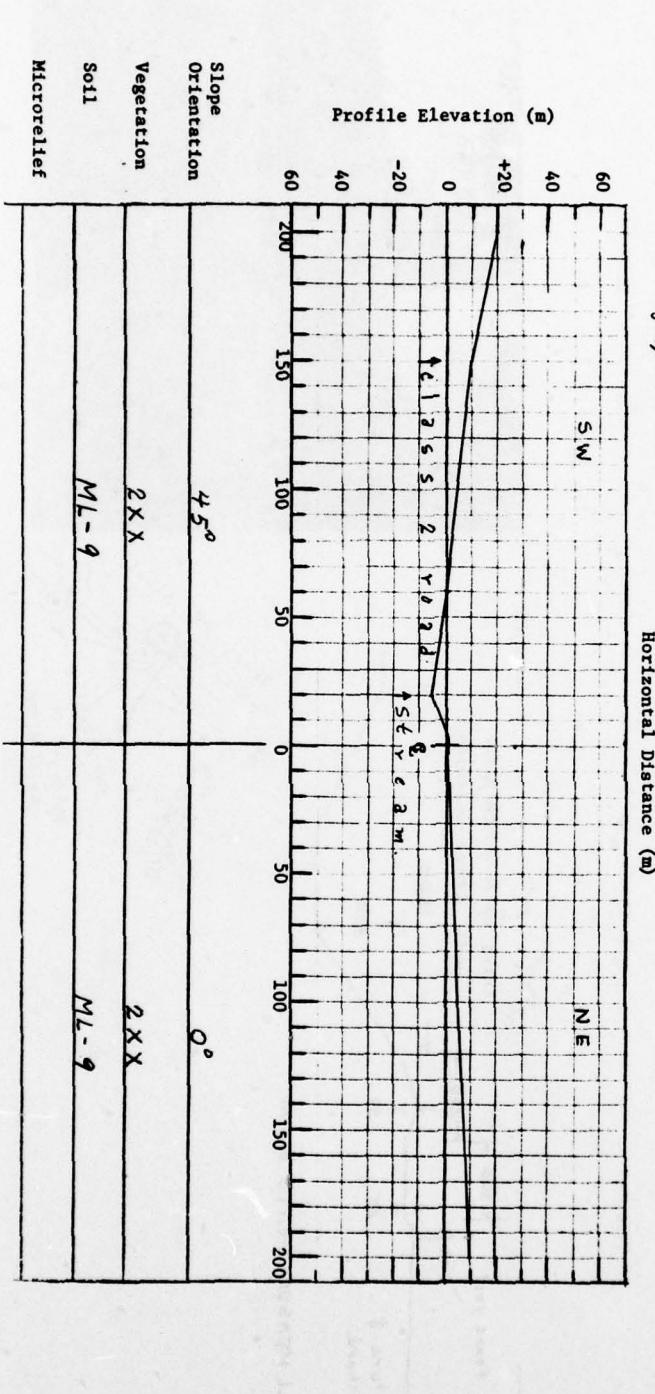
Scale: 1:50000

te: 33ePL /4

Coordinate Location: Geographic: 50°45'23"N UTM Ref.:

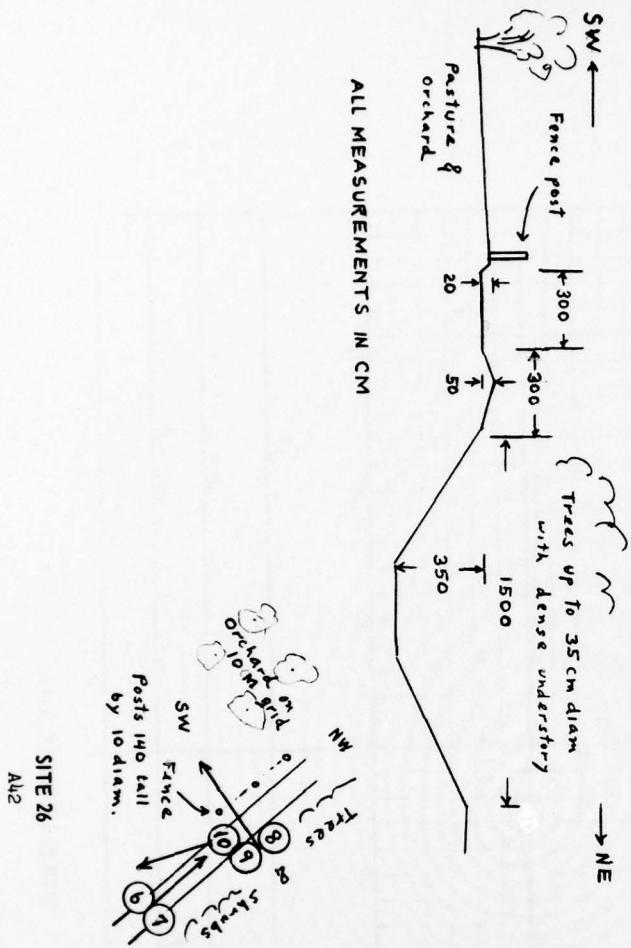
Road: Class: 4 Direction: NW Site Type: 3

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

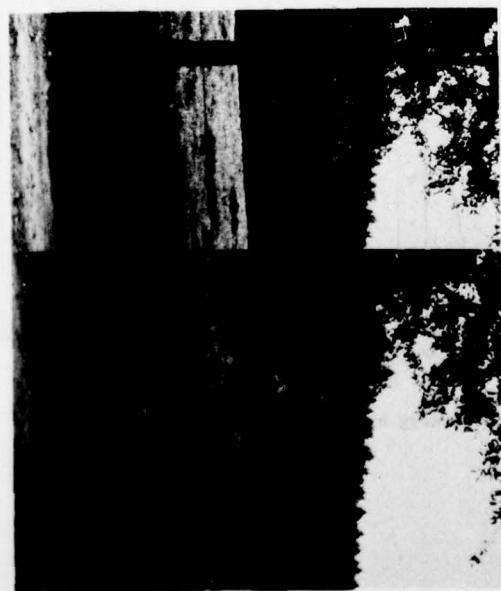


SITE 26 – PROFILE DATA

A41



SITE 26
A42



Sample Number: 27

Date: 3 Sept 74

Notes and Comments:

Map Number:

Scale: 1:50000

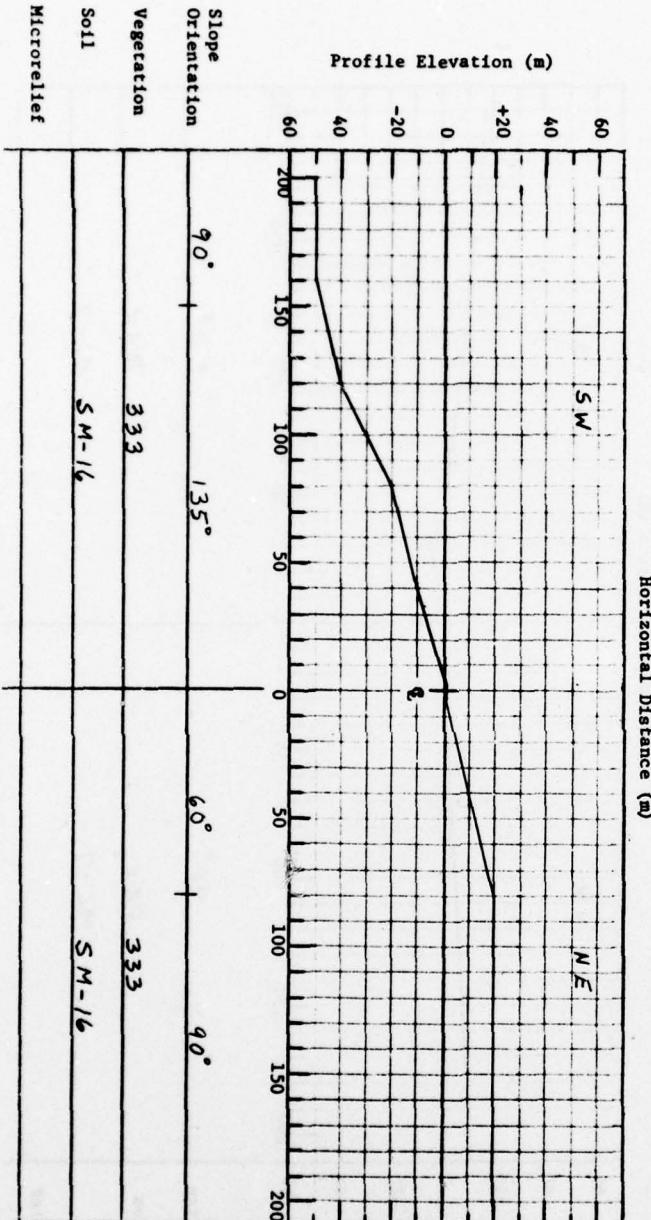
Coordinate Location: Geographic: $50^{\circ}47'22''N$ UTM Ref.:

Landscape: Shrub-covered hillside
 $08^{\circ}15'00'E$

Road: Class: 5 Direction: NW Site Type: 2

Construction:		Traffic Surface	Material	Thickness (cm)	Shoulder Width (m)	Material
Width (m)	Surface	Base	Subbase			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



SITE 27 - PROFILE DATA

A43

Slope Orientation
Vegetation
Soil
Microlief

90°
 135°
 60°
 90°

333
333

SM-16
SM-16

Sample Number: 28

Date: 3 Sept 74

Notes and Comments:

Map Number: L5316

Scale: 1:50000

Coordinate Location:

Geographic: 50°45'38"N UTM Ref.:
08°36'05"E

Landscape: Coated valley

Road: Class: 4

Direction: NE

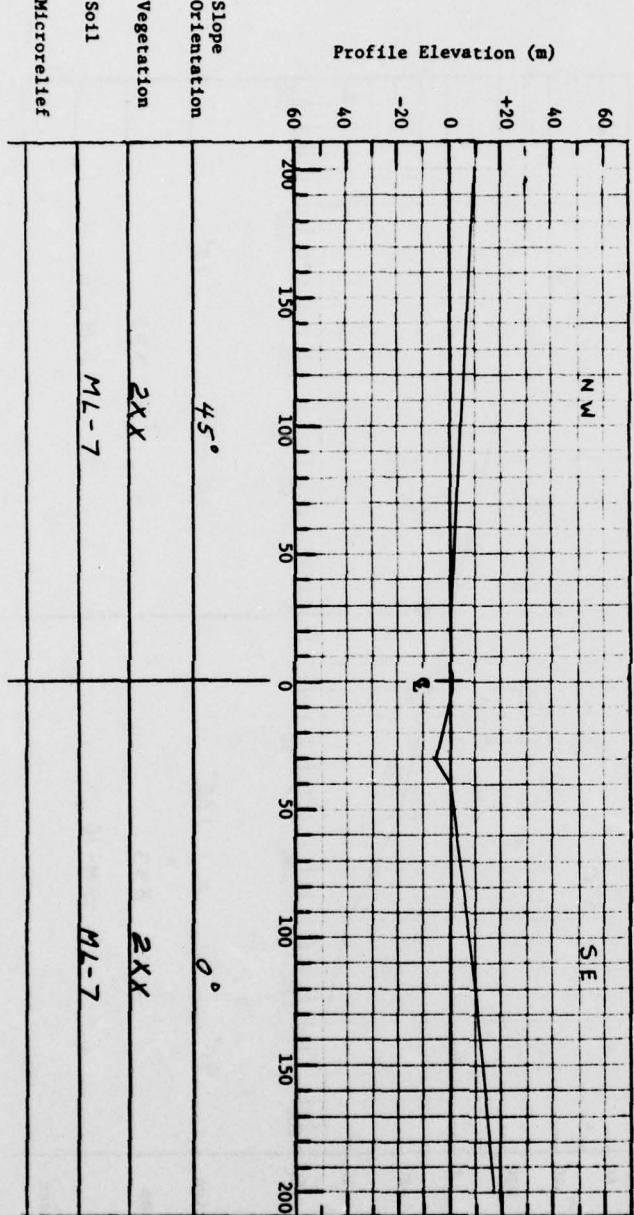
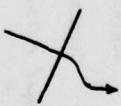
Site Type: 3

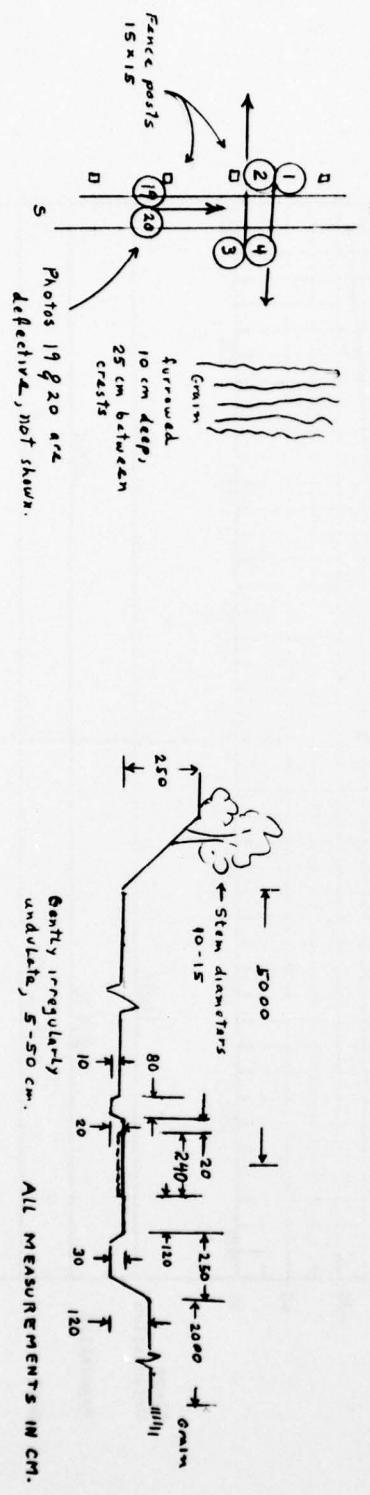
Construction:

Width (m)	Traffic Surface			Shoulder Material
	Surface Blacktop	Material	Thick (cm)	
2.4	Base			Subbase

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.





SITE 28

A45

Sample Number: 29

Date: 3 Sept 74

Notes and Comments:

Map Number: L53/6

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}46'00''N$ UTM Ref.:

Landscape: ~~Forested + cultivated upland~~ $08^{\circ}36'43''E$

Road: Class: 2

Direction: NW Site Type: 2

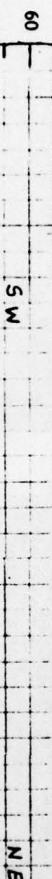
Construction:

Width (m)	Traffic Surface *			Shoulder	
	Surface Material	Thickness (cm)	Width (m)	Material	
1.8	Blacktop		2		
	Base				
	Subbase				

* Data from field observation. See sketch, page A150.

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation

Vegetation

Soil

Microrelief

5XX

2XX

CL-13

CL-1

Sample Number: 30

Date: 3 Sept 74

Notes and Comments:

Map Number: L 5316

Scale: 1:50000

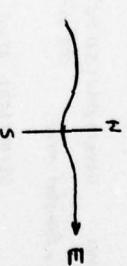
Coordinate Location: Geographic: 50°46'30"N UTM Ref.:

Landscape: Fresh cut bank 1.1 08°37'33"E

Road: Class: 5

Direction: E

Site Type: 2

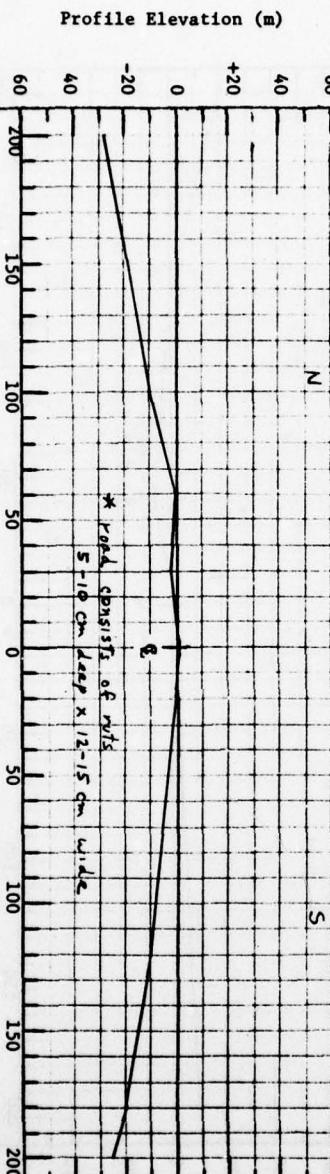


Construction:

Width (m)	Traffic Surface Material	Thickness (cm)	Width (m)	Shoulder Material
* mts	* soil			

Instruction: On transect profile sketch show location of important features such as stream crossings, ditches, etc.
* from field observation Aug 1974

Profile Elevation (m)



Slope
Orientation

150° 180°

Vegetation

4XX

Soil

ML-12 (* clay loam,
with angular ML-7
rock chips less than 3 cm diam.)

Microrelief

low relief

Sample Number: 31

Date: 3 Sept 74

Map Number: L 5314 Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}4'41''N$ UTM Ref.:
 $08^{\circ}37'56''E$

Landscape: C. H. wood & forested valley

Road: Class: 3 Direction: NW Site Type: 3

Construction:

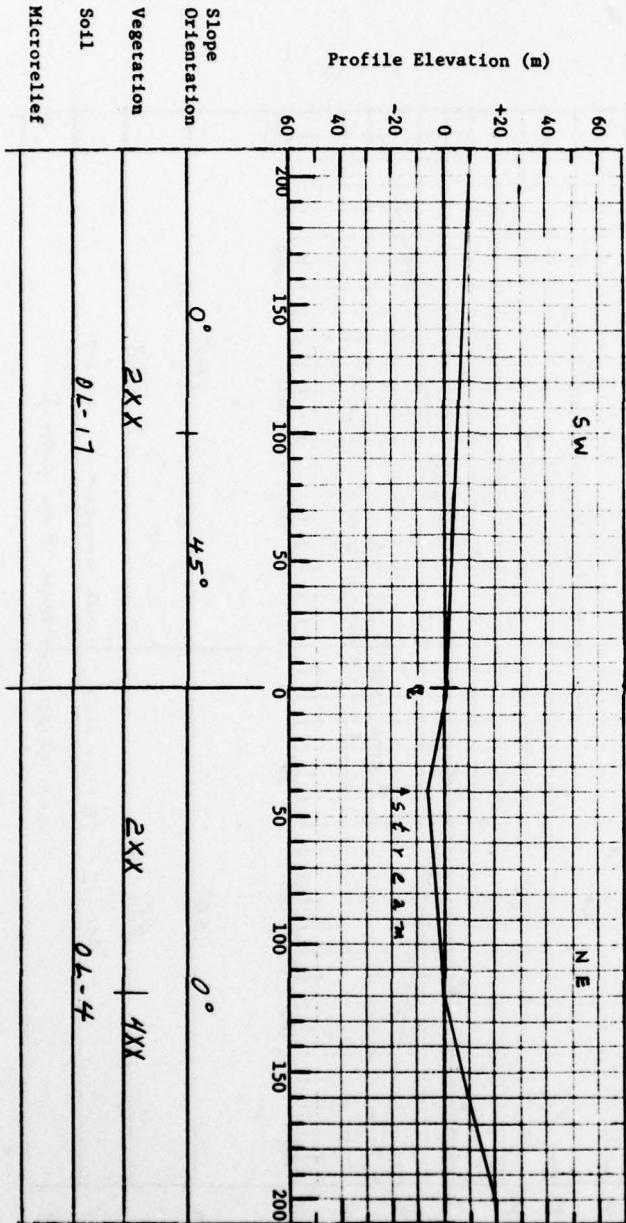
Width (m)	Traffic Surface		Shoulder Material
	Material	Thick. (cm)	
4.4	Black Top	0.50	
	Base		
	Subbase		

Horizontal Distance (m)



ALL MEASUREMENTS IN CM

SITE 31



SITE 31 - PROFILE DATA

A48

Slope Orientation

Vegetation

Soil

Microrelief

2XX

2XX

DL-17

DL-4

Sample Number: 32

Date: 3 Sept 74

Notes and Comments:
Soil Map:

Map Number: 5219 Scale: 1:25000

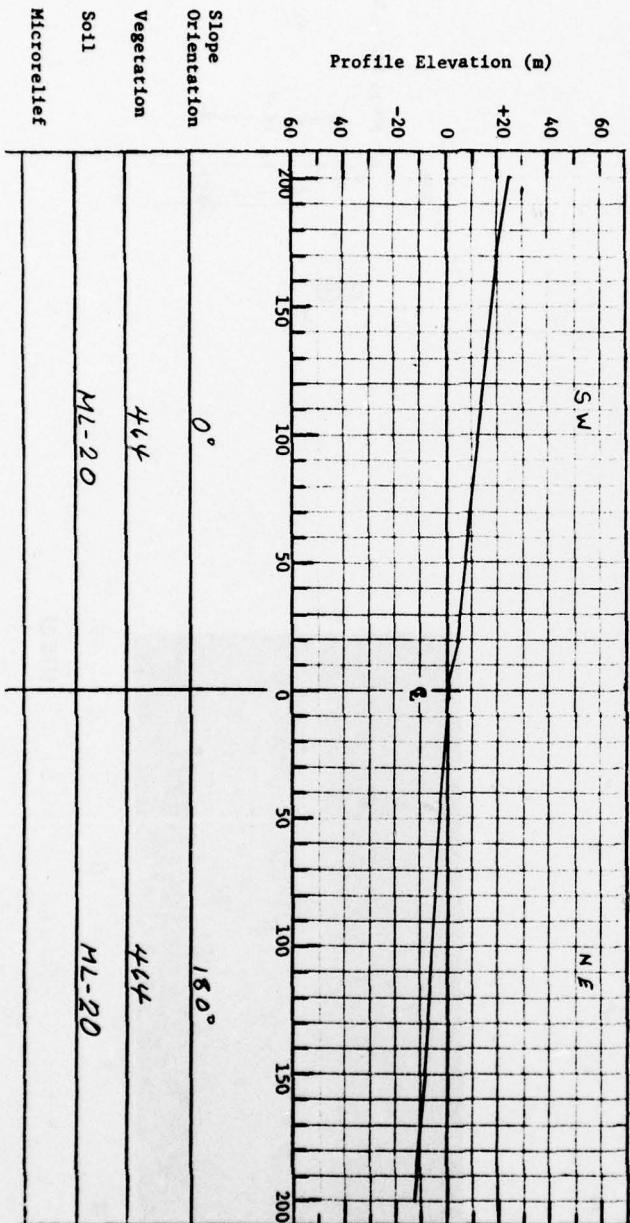
Coordinate Location: Geographic: $50^{\circ}44'00''N$ UTM Ref.: $08^{\circ}55'10''E$

Landscape: ~~Frosty hill slope~~

Road: Class: 5 Direction: NW Site Type: 4

Construction:	Width (m)	Traffic Surface Material	Thick (cm)	Width (m)	Shoulder Material
*	5	Surf. * thin gravel			

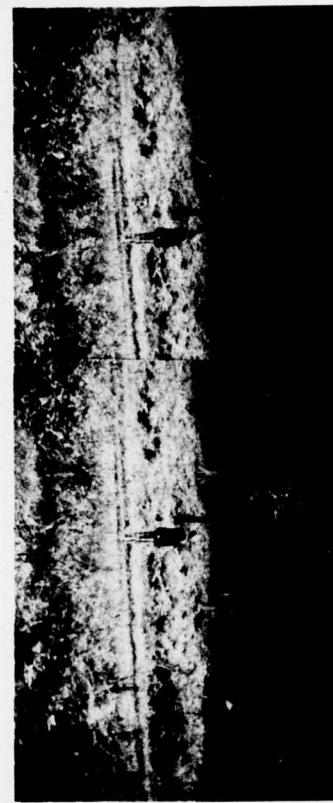
Horizontal Distance (m)



* Ground observation Aug 1924

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Slope Orientation
Vegetation
Soil
Microrelief

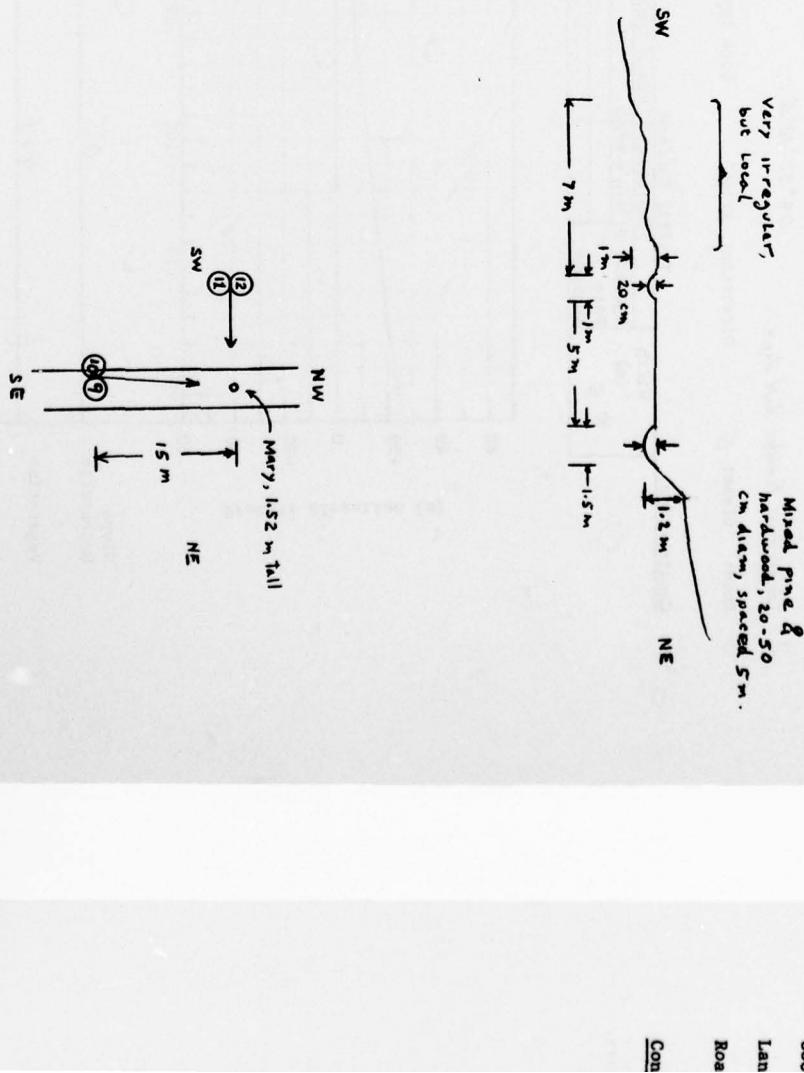


12

二



5



SIE 32

Sample Number: 33

Date: 3 Sept 74

Map Number: 5219

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}44'00''N$ UTM Ref.:

Landscape:

$08^{\circ}55'23'E$

Road: Class: 5

Direction: N

Site Type: 2

Notes and Comments:

Sources:

Map 1964
(1943 data)

* Field observation,
Aug 1974.

Construction:

Width (m)	Traffic Surface		Shoulder Width (m)	Material
	Surface Material	Thickness (cm)		
* 2.5				

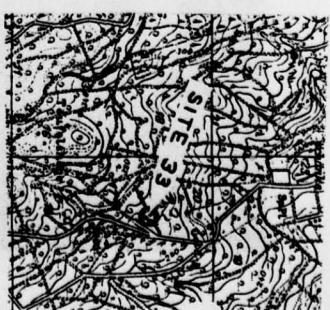
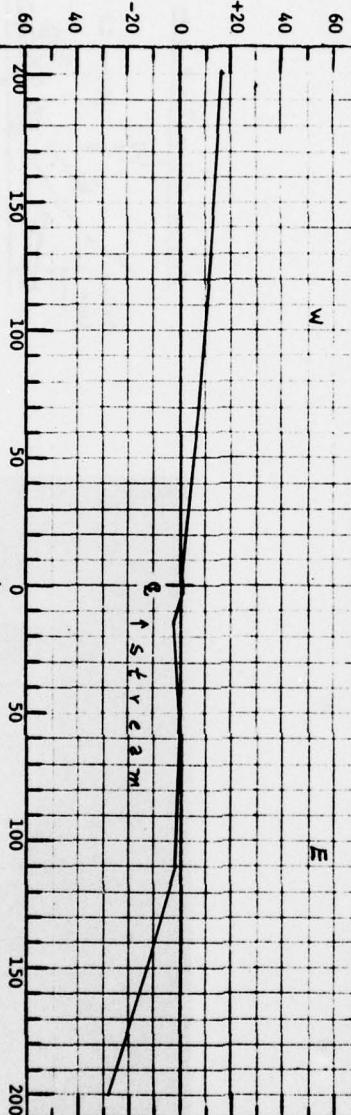
Horizontal Distance (m)

W

E

C ↑ 5 ft rev 2 m

Profile Elevation (m)



Slope
Orientation

Vegetation

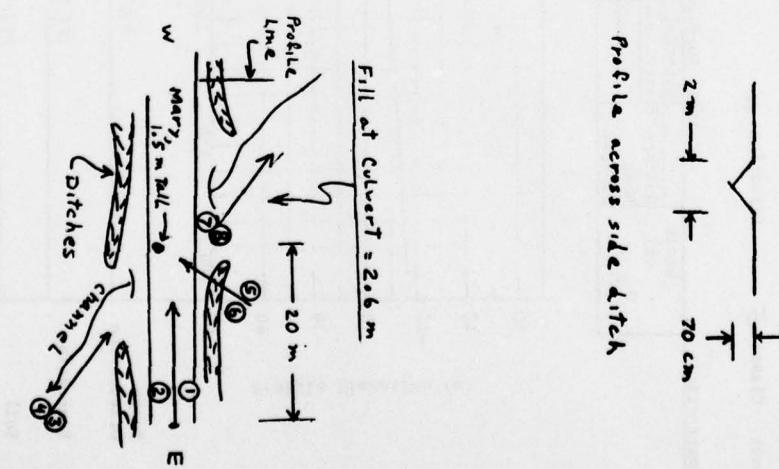
Soil

Microrelief

46%

ML-20

ML-20



SITE 33 (Sheet 1 of 2)

Sample Number

Map Number: 4

Coordinate L

Landscape: C

Road: Clas

Construction



4

3



7

8

SITE 33 (Sheet 2 of 2)

Profile Elevation (m)

Slope
Orientation

Vegetation

Soil

Microre

A53

Sample Number: 34

Date: 3 Sept 74

Notes and Comments:

Map Number: 5219

Scale: 1:25000

Sources:

MAP 19

AIRPHOTOS 19

Coordinate Location:

Geographic: 50°43'58"N UTM Ref.:

Landscape: Cultivated lowland

08°58'18"E

* field observation

Road: Class: 3

Direction: NW

Site Type: 4

Sample Map

Co

Land

Roa

Construction:

Traffic Surface

Shoulder

Width (m)

Material

Material

Width (m)

Surface

Material

Base

Material

Subbase

Material

Horizontal Distance (m)

60

40

+20

0

-20

40

60

-200

-150

-100

-50

0

50

100

150

200

N

E

SW

NE

Profile Elevation (m)

railroad

class 5

road

Slope Orientation

150°

45°

Vegetation

2XX

2XX

Soil

SC-4 (* silt loam)

(* silt loam)

SC-4

Microrelief

Sample Number:

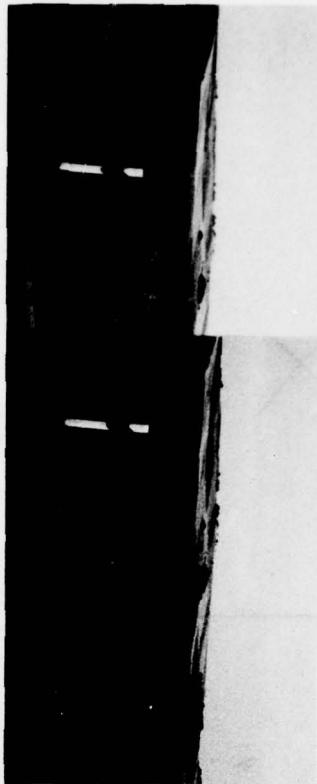
Map Number: A

Coordinate L:

Landscape: C

Road: Class

Construction



16

15

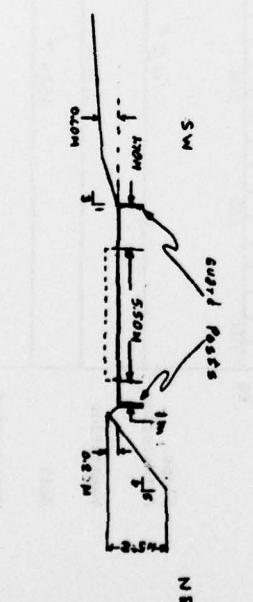
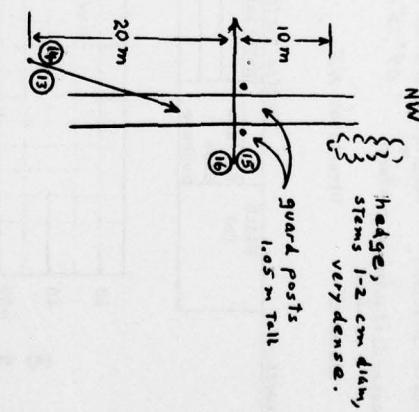


14

13

SITE 34

A55



Micro

Soil

Vegetat

Slope

Orientation

Profile Elevation (m)

Sample Number: 35

Date: 3 Sept 74

Notes and Comments:

Map Number: 5221

Scale: 1:25000

Sample

Coordinate Location:

Geographic: $50^{\circ}45'17''N$ UTM Ref.:

Map N

Landscape: Cultivated & pasture

$09^{\circ}15'00''E$

Coord

Road: Class: 5

Direction: NE Site Type: 4

Lands

Road:

Direction: NE

Road:

Construction:

Traffic Surface

Material

Thickness (cm)

Shoulder

Width (m)

Material

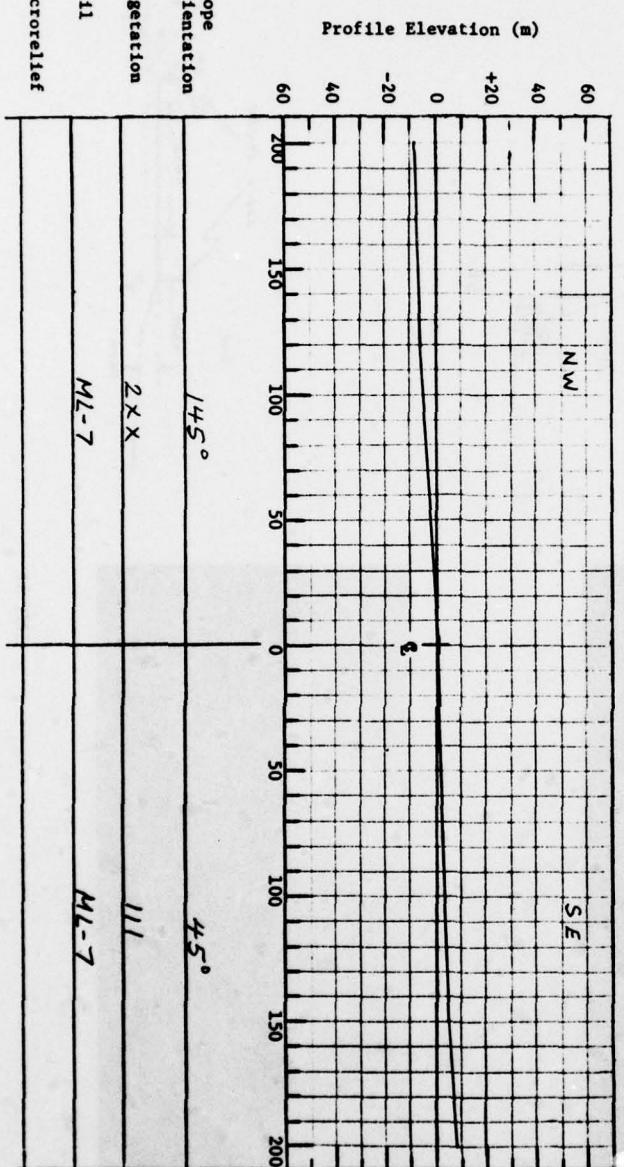
Width (m)	Traffic Surface Material	Thickness (cm)	Shoulder Width (m)	Material
	Surface			
	Base			

Subbase

etc.

Consti

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope

Orientation

Vegetation

Soil

Microrelief

Sample Number: 36

Date: 3 Sept 74

Map Number: 5221

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}45'23''N$ UTM Ref.:
 $09^{\circ}15'10'E$

Landscape: ~~Cultivated lowland~~

Road: Class: 2

Direction: NW Site Type: *✓*

Notes and Comments:

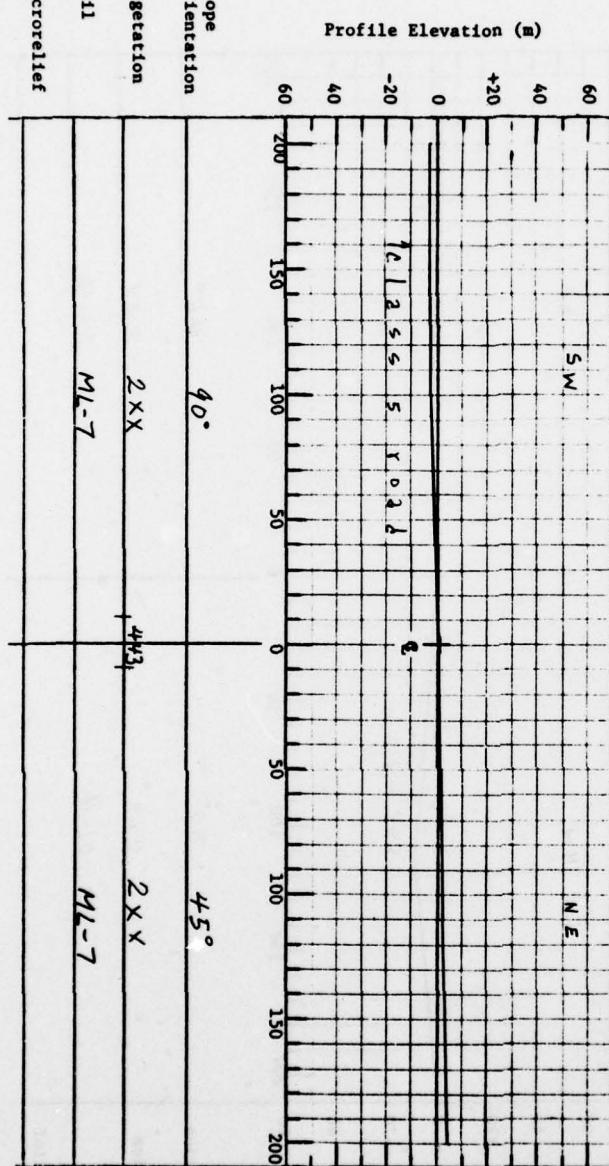


Construction:

Width (m)	Traffic Surface		Shoulder (m)	Material
	Surface	Base		

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Sample Number: 37

Date: 3 Sept 74

Map Number: 5221 Scale: 1:25000

Coordinate Location: Geographic: 50°46'07"N UTM Ref.: 090/500

Landscape: *Cultivated land*

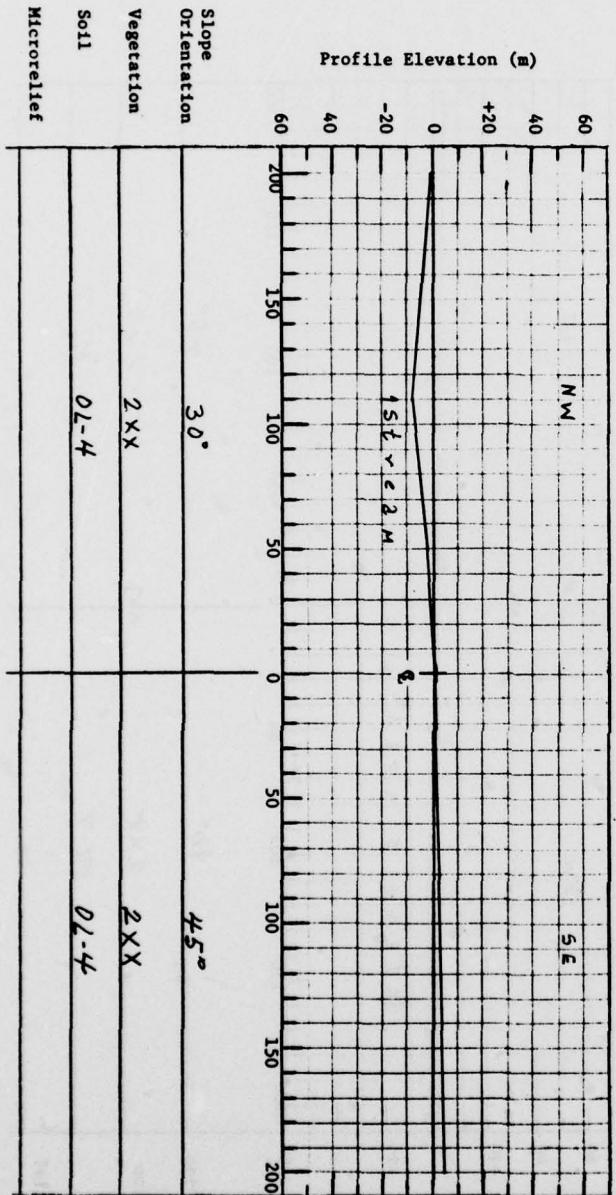
Road: Class: 4 Direction: N-E Site Type: 4

Notes and Comments:



Construction:	Width (m)	Traffic Surface Material	Thickness (cm)	Shoulder Width (m)	Material
		Surface			
		Base			
		Subbase			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Sample Number: 38

Date: 3 Sept 74

Notes and Comments:

Sample Nu

Map Number: 5221 Scale: 1:25000

Map Numbe

Coordinate Location:

Coordinate

Landscape: *Cultivated land* Geographic: 50°46'17"N UTM Ref.: 09°15'00"E

Landscape

Road: Class: 3

Road: C

Direction: NW

Direction

Site Type: *✓*

Site Type

Construction:

Width (m)	Traffic Surface		Shoulder Width (m)	Material
	Material	Thickness (cm)		
Base				
Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

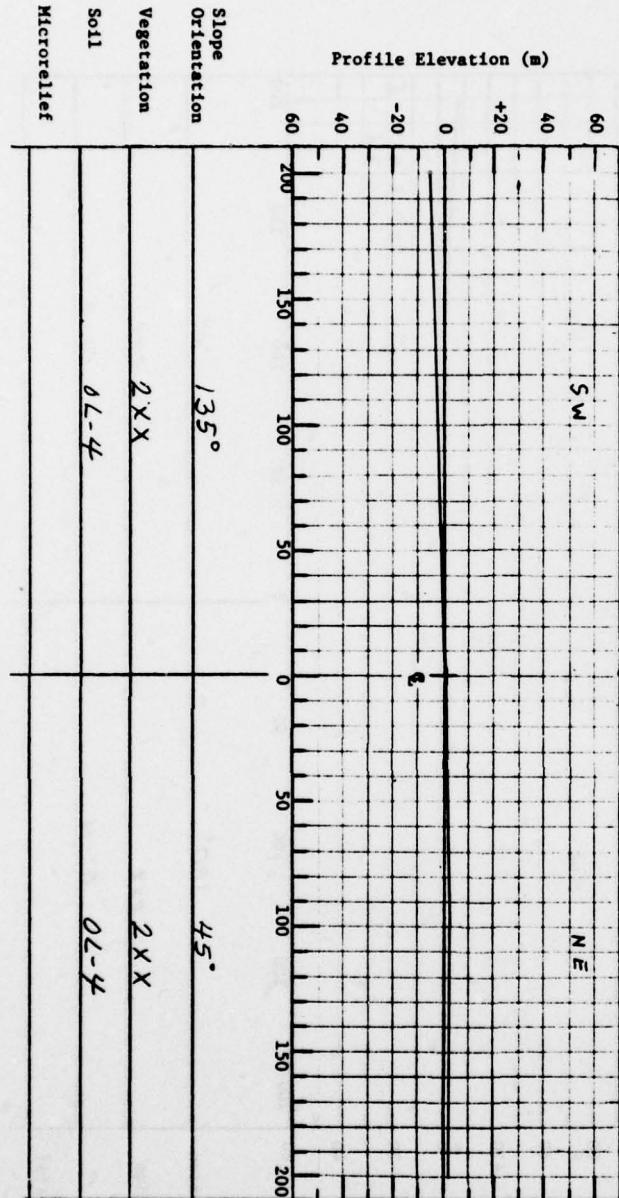
Slope

Orientation

Vegetation

Soil

Microrelief



Sample Number: 39

Date: 4 Sept 74

Notes and Comments:

Map Number: 5223

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}45'03''N$ UTM Ref.:

Landscape: *Rain forest + cultivated*

09^o35'13"E

Road: Class: 5

Direction: NW

Site Type: /

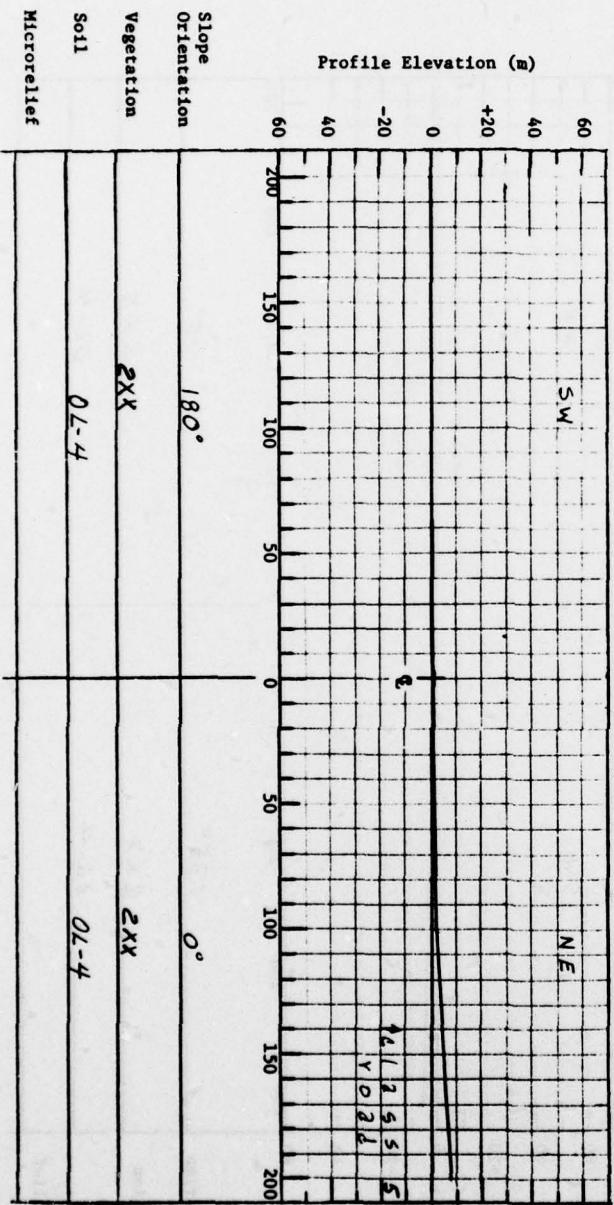
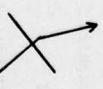
Construction:

Width (m)	Traffic Surface		Shoulder Width (m)	Material
	Material	Thick (cm)		
Surface			Base	
Subbase				

Horizontal Distance (m)



Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



SITE 39 - PROFILE DATA

Sample Number: 40

Date: 4 Sept 74

Notes and Comments:

Map Number: 5223

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}45'10''N$ UTM Ref.:

Landscape: Cut/Hilled valley slope

$09^{\circ}35'18''E$

Road: Class: 3

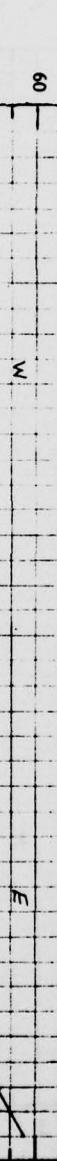
Direction: N

Site Type: 4

Construction:

Width (m)	Traffic Surface		Shoulder Width (m)	Material
	Surface	Base		
Subbase				

Horizontal Distance (m)



Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Slope Orientation	180°
Vegetation	2xx
Soil	ML-3
Microrelief	ML-3

Sample Number: 41

Date: 4 Sept 74

Notes and Comments:

Map Number: 5223 Scale: 1:25000

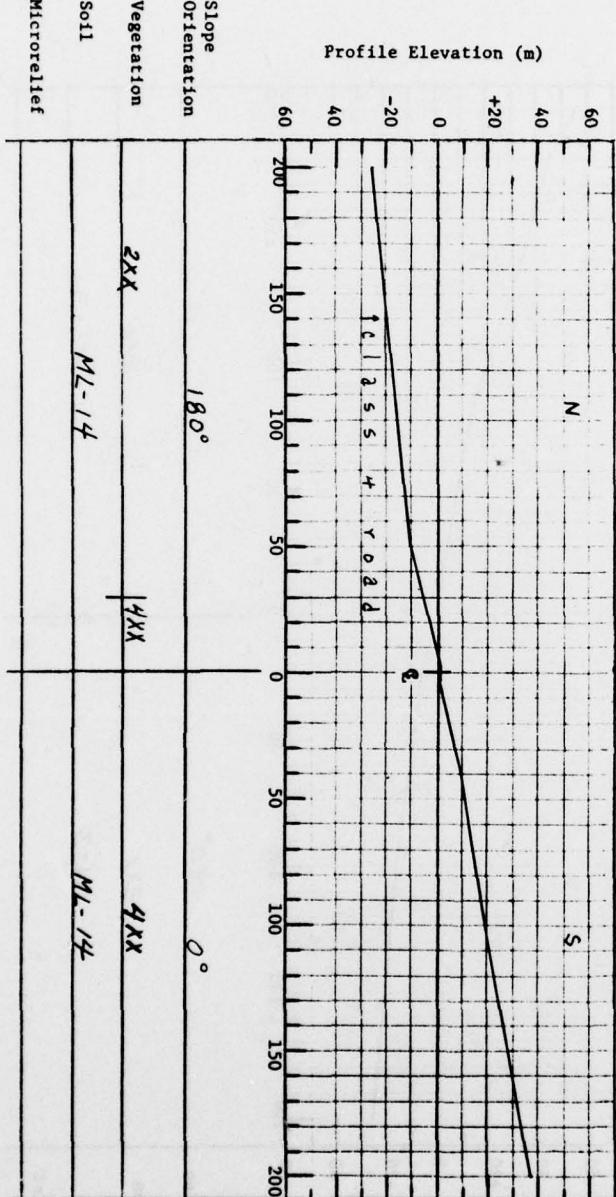
Coordinate Location: Geographic: $50^{\circ}45'23''$ UTM Ref.: $09^{\circ}35'41''$

Landscape: Cultivated, forested hillside

Road: Class: 4 Direction: E Site Type: 4

Construction:		Traffic Surface		Shoulder	
Width (m)	Material	Thick (cm)	Width (m)	Material	
Surface			Base		
Subbase					

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Sample Number: 42

Date: 4 Sept 74

Notes and Comments:

Map Number: 5225

Scale: 1:25000

Sample N

Map Num

Coordinate Location:

Geographic: $50^{\circ}45'0''N$ UTM Ref.:

Coordina

Landscape: ~~Forested & cultivated~~

$09^{\circ}55'24''E$

Landsca

Road: KJ/Sek

Road:

Class: 3

Class:

Direction: NW

Dir

Site Type: /

Site T

Construction:

Width (m)	Traffic Surface			Shoulder Material
	Surface	Material	Thick (cm)	
Base			(m)	
Subbase				

Horizontal Distance (m)

N E

60

40

+20

0

-20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

320

340

360

380

400

420

440

460

480

500

520

540

560

580

600

620

640

660

680

700

720

740

760

780

800

820

840

860

880

900

920

940

960

980

1000

1020

1040

1060

1080

1100

1120

1140

1160

1180

1200

1220

1240

1260

1280

1300

1320

1340

1360

1380

1400

1420

1440

1460

1480

1500

1520

1540

1560

1580

1600

1620

1640

1660

1680

1700

1720

1740

1760

1780

1800

1820

1840

1860

1880

1900

1920

1940

1960

1980

2000

2020

2040

2060

2080

2100

2120

2140

2160

2180

2200

2220

2240

2260

2280

2300

2320

2340

2360

2380

2400

2420

2440

2460

2480

2500

2520

2540

2560

2580

2600

2620

2640

2660

2680

2700

2720

2740

2760

2780

2800

2820

2840

2860

2880

2900

2920

2940

2960

2980

3000

3020

3040

3060

3080

3100

3120

3140

3160

3180

3200

3220

3240

3260

3280

3300

3320

3340

3360

3380

3400

3420

3440

3460

3480

3500

3520

3540

3560

3580

3600

3620

3640

3660

3680

3700

3720

3740

3760

3780

3800

3820

3840

3860

3880

3900

3920

3940

3960

3980

4000

4020

4040

4060

4080

4100

4120

4140

4160

4180

4200

4220

4240

4260

4280

4300

4320

4340

4360

4380

4400

4420

4440

4460

4480

4500

4520

4540

4560

4580

4600

4620

4640

4660

4680

4700

4720

4740

4760

4780

4800

4820

4840

4860

4880

4900

4920

4940

4960

4980

5000

5020

5040

5060

5080

5100

5120

5140

5160

5180

5200

5220

5240

5260

5280

5300

5320

5340

5360

Notes and Comments:

Sample Number: 43

Date: 4 Sept 74

Map Number: 5225

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}45'00''N$ UTM Ref.:

Landscape: Cultivated hillside

$09^{\circ}55'48''E$

Road: Class: 5

Direction: NW

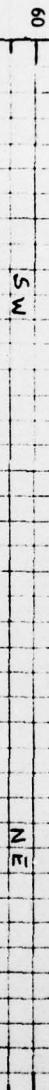
Site Type: 2/3

a.g
20-50
paced 5m.

NE

Construction:	Width (m)	Traffic Surface	Material	Thick (cm)	Shoulder Width (m)	Material
		Surface				
		Base				
		Subbase				

Horizontal Distance (m)



Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



NE

SW

SITE 43 - PROFILE DATA
A64

Slope Orientation	180°	20°	150°
Vegetation	XXX	XXX	
Soil	C-L-7	C-L-7	
Microrelief			

Sample Number: 44

44

Date: 4 Sept 74

Map Number: 5225

Scale: 1:25 000

Coordinate Location:

Geographic: 50°45'00"N UTM Ref.:

Landscape: ~~Forested & cut timber hillside~~ 09°56'27"E

Road: Class: 4

Direction: N Site Type: 4

Notes and Comments:

↑ ↗

Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Material	Thick (cm)	Base		
Surface			Subbase		

Horizontal Distance (m)



Instruction: On transect profile sketch show

location of important features,
such as stream crossings, ditches,
etc.

Slope Orientation	135°	40°
Vegetation	6XX	2XX
Soil	CL-19	CL-9
Microrelief		

Sample Number: 45

Date: 4 Sept 74

Notes and Comments:

Map Number: 5225

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}45'00''N$ UTM Ref.:
 $09^{\circ}56'42''E$

Landscape: Cut/Hilled hillside

Road: Class: 2

Direction: NE

Site Type: /

Construction:

Width (m)	Traffic Surface			Shoulder	
	Material	Thick (cm)	Width (m)	Material	
	Surface				
	Base				
	Subbase				

Horizontal Distance (m)

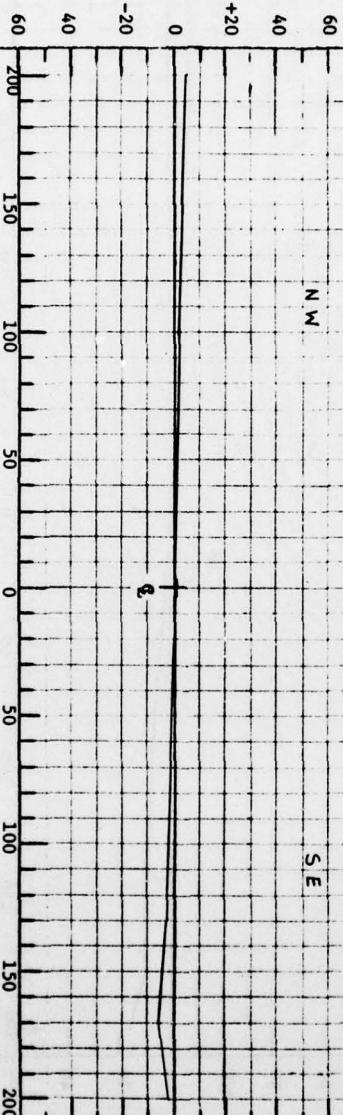
Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

NW

SE

E

Profile Elevation (m)



Slope
Orientation

90°

Vegetation

2XX

Soil

CL-7

Microrelief

CL-7

Sample Number: 46

Date: 4 Sept 74

Notes and Comments:

Map Number: L5574

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}33'00''N$ UTM Ref.:
 $08^{\circ}15'14''E$

Landscape: ~~Confronted hillside~~

Road: Class: 5

Direction: NW

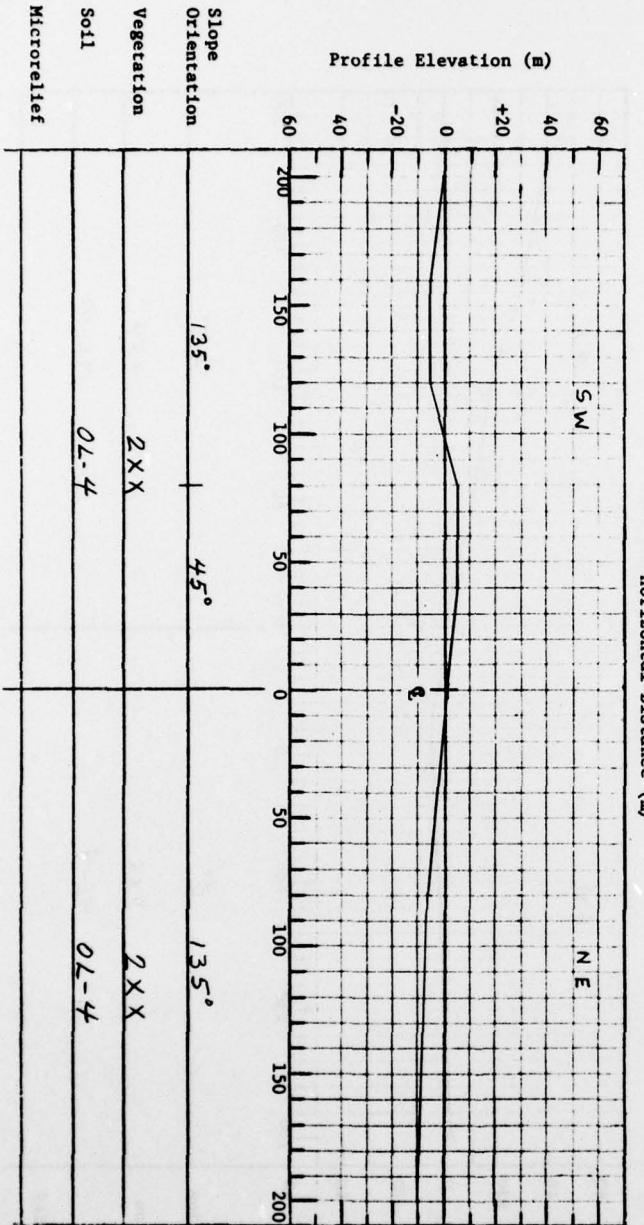
Site Type: 3/2

Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Surface	Material	Thick. (cm)		
Base					
Subbase					

Instruction:

On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Sample Number: 47

Date: 4 Sept 74

Notes and Comments:

Map Number: L 5514

Scale: 1:50000

Coordinate Location:

Geographic: 50°33'00"N UTM Ref.:

Landscape: Cut Head Waterfall
Forest Hillside

Road: Class: 3

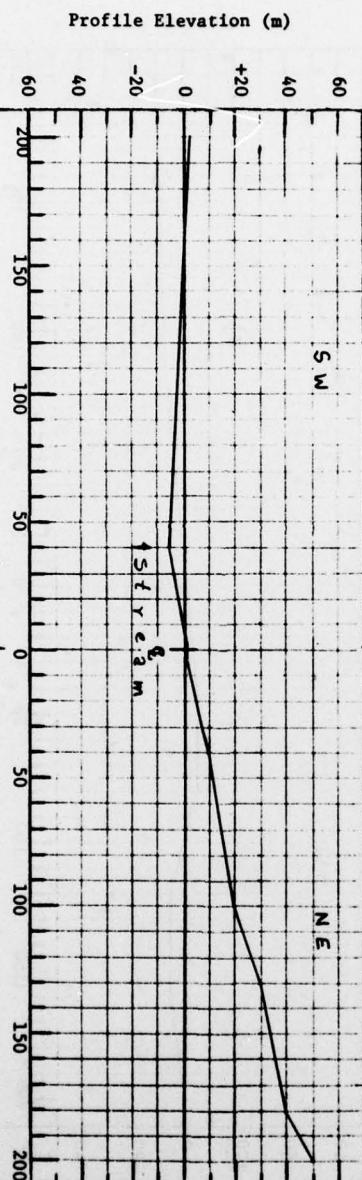
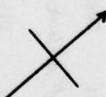
Direction: NW Site Type: 3

Construction:

Width (m)	Traffic Surface			Width (m)	Shoulder Material
	Surface	Material	Thick (cm)		
Base				Subbase	

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation

0°

45°

Vegetation

2XX

454

Soil

ML-9

ML-10

Microrelief

Sample Number: 48

Date: 4 Sept 74

Notes and Comments:

Map Number: L 5514

Scale: 1:50000

Date:

Coordinate Location:

Geographic: 50°33'00"N UTM Ref.: 08°15'16"E

Landscape: Cultivated valley bottom

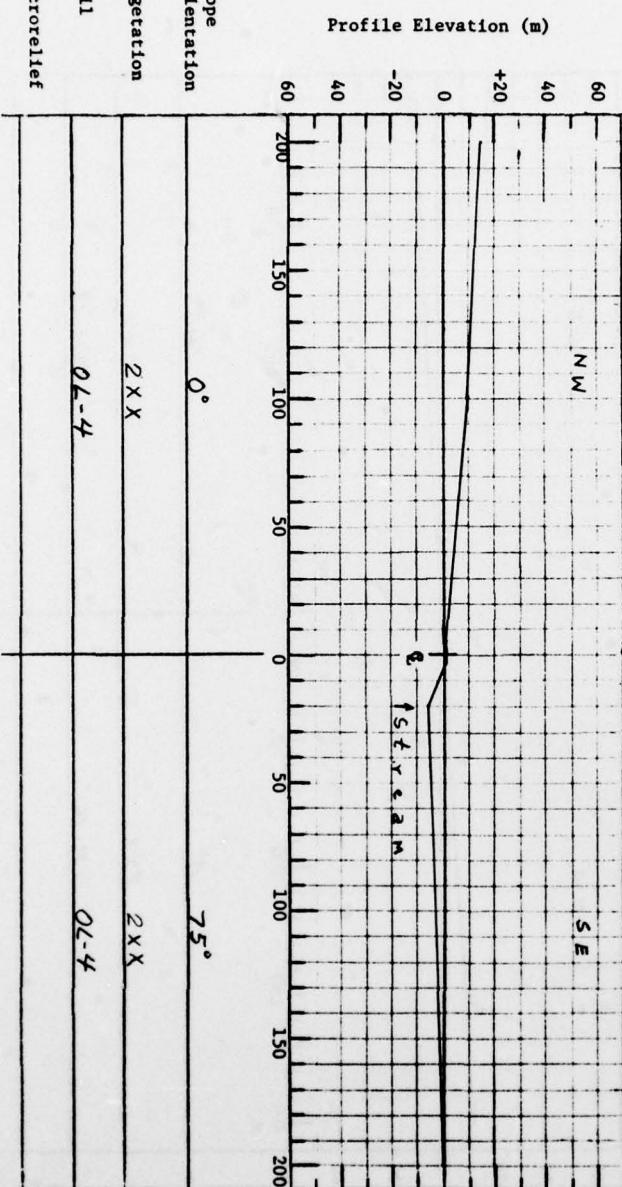
Road: Class: 4

Direction: NE

Site Type: 3/2

Construction:		Traffic Surface		Shoulder	
Width (m)	Material	Thick (cm)	Width (m)	Material	
Surfacing					
Base					
Subbase					

Horizontal Distance (m)



Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Slope Orientation

0°

75°

Vegetation

2XX

2XX

Soil

0L-4

0L-4

Microrelief

Sample Number: 49

Date: 4 Sept 74

Notes and Comments:

Map Number: L 5516

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}33'22''N$ UTM Ref.:

Landscape: *Cultivated hill slope*

Or $35'00''E$

Road: Class: 5

Direction: NE

Site Type: 4

Construction:

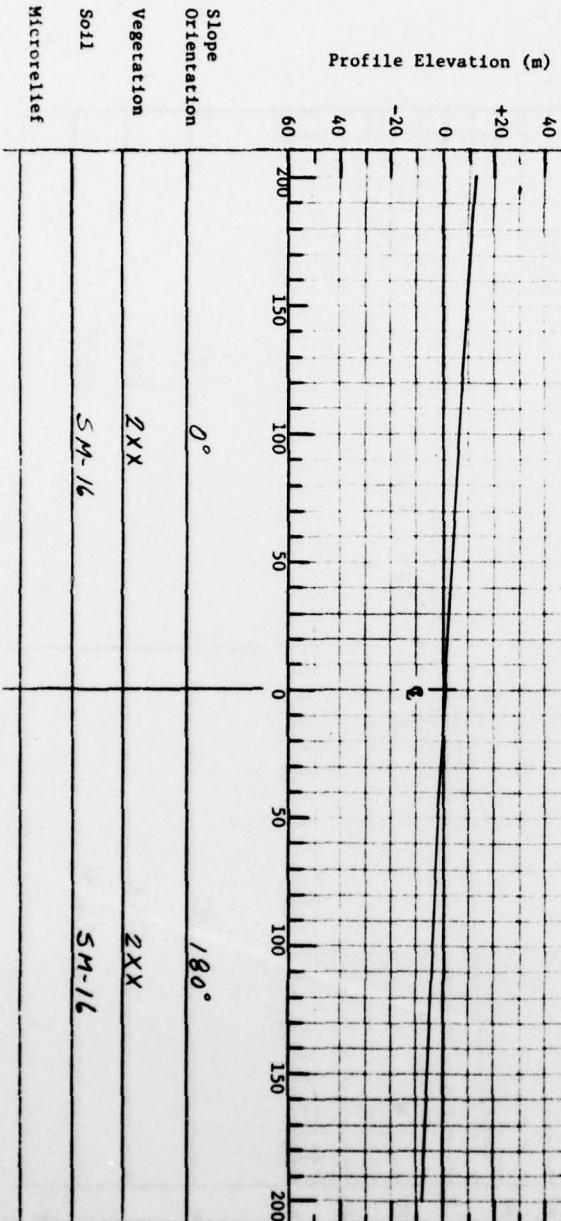
Width (m)	Traffic Surface		Thickness (cm)	Width (m)	Shoulder Material
	Surface	Base			
Subbase					

Horizontal Distance (m)



Instruction: On transect profile sketch show

Location of important features,
such as stream crossings, ditches,
etc.



Sample Number: 50

Date: 4 Sept 74

Notes and Comments:

Map Number: L 55/4

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}33'32''N$ UTM Ref.:

Landscape: Cut/Hatched hill slope

08°35'00"E

Road: Class: 2

Direction: NE

Site Type: 2

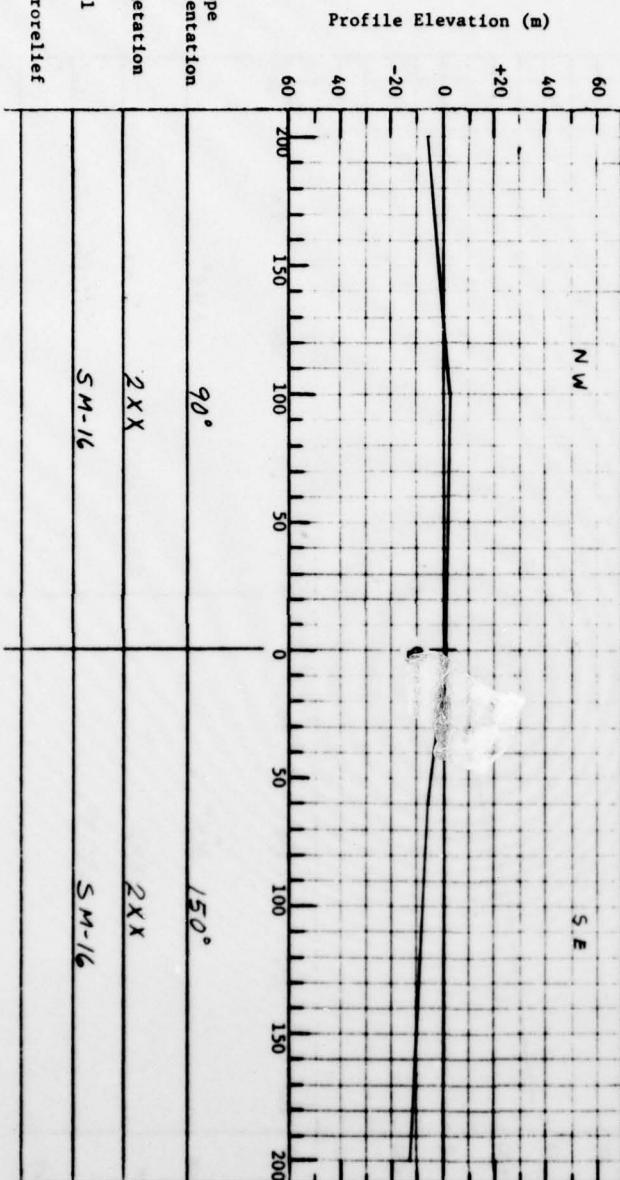
Construction:	Width (m)	Traffic Surface		Shoulder (m)	Material
		Material	Thick (cm)		
		Surface	Base		
		Subbase			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)

N.W

S.E



Slope Orientation

90°

150°

Vegetation

2XX

2XX

Soil

SM-16

SM-16

Microrelief

Notes and Comments:

Sample Number: 51

Scale: 1:50000

Date: 4 Sept 74

Map Number: L 5516

Coordinate Location:

Geographic: $50^{\circ}34'03''N$ UTM Ref.:Landscape: ~~Forested~~ hillside, pasture
flatplain

Road: Class: 3

Direction: NW

Site Type: 3

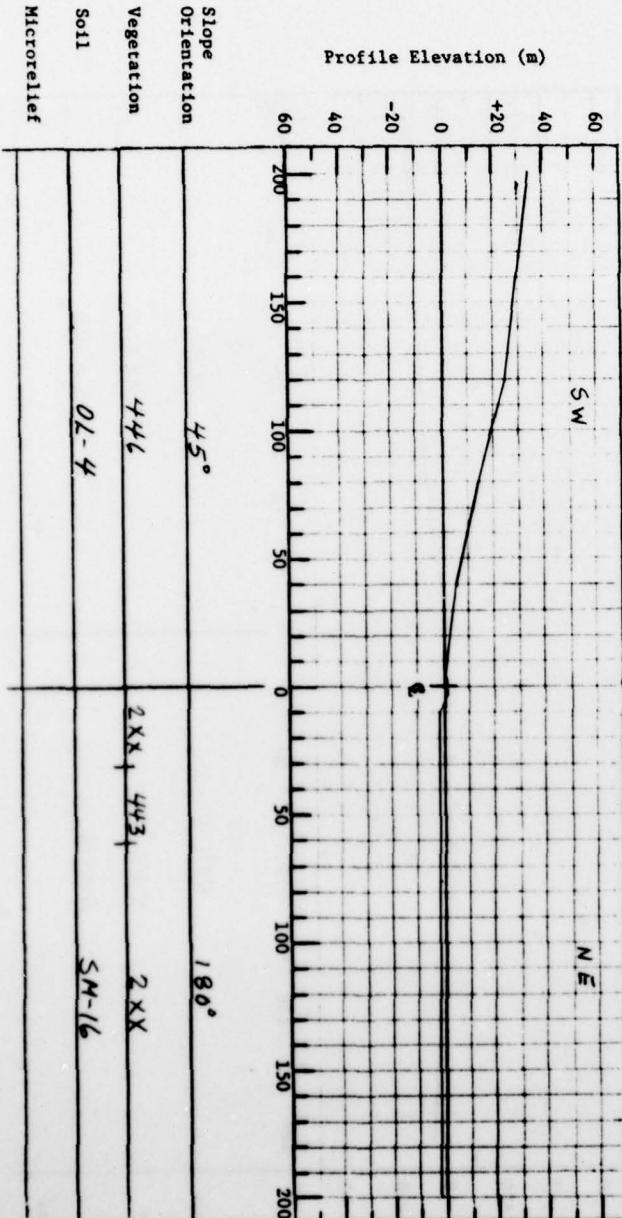
Construction:

	Traffic Surface	Shoulder		
Width (m)	Material	Thick (cm)	Width (m)	Material
Surface				
Base				
Subbase				

Width (m)	Surface Material	Thick (cm)	Width (m)	Shoulder Material

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Sample Number: 52

Date: 4 Sep '74

Notes and Comments:

Map Number: L 55/6

Scale: 1:50000

Coordinate Location:

Geographic: 50° 35' 13" N UTM Ref.:

Landscape: Cut intoed valley slopes

08° 35' 00" E

Road: Class: 4

Direction: NW

Site Type: 3

Construction:

Width (m)	Traffic Surface			Width (m)	Shoulder Material
	Surface	Material	Thick (cm)		
Base				Subbase	

Instruction:

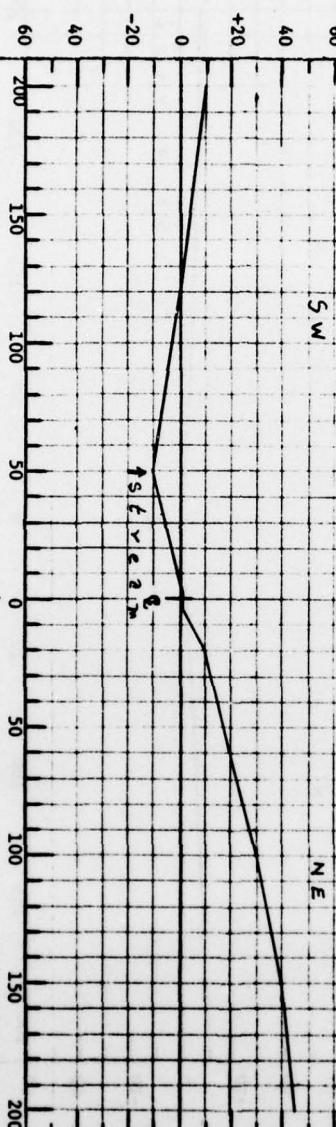
On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)

SW

NE

Profile Elevation (m)



Slope
Orientation

0°

0°

Vegetation

2XX

2XX

Soil

OL-6

OL-17

Microrelief

Sample Number: 53

Date: 6 Sept 74

Notes and Comments:

Map Number: L 5518

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ} 33' 39''N$ UTM Ref.:

Landscape: Cut situated

and ~~sloped~~ upland

Road: Class: 5

Direction: E

Site Type: 3

N

S

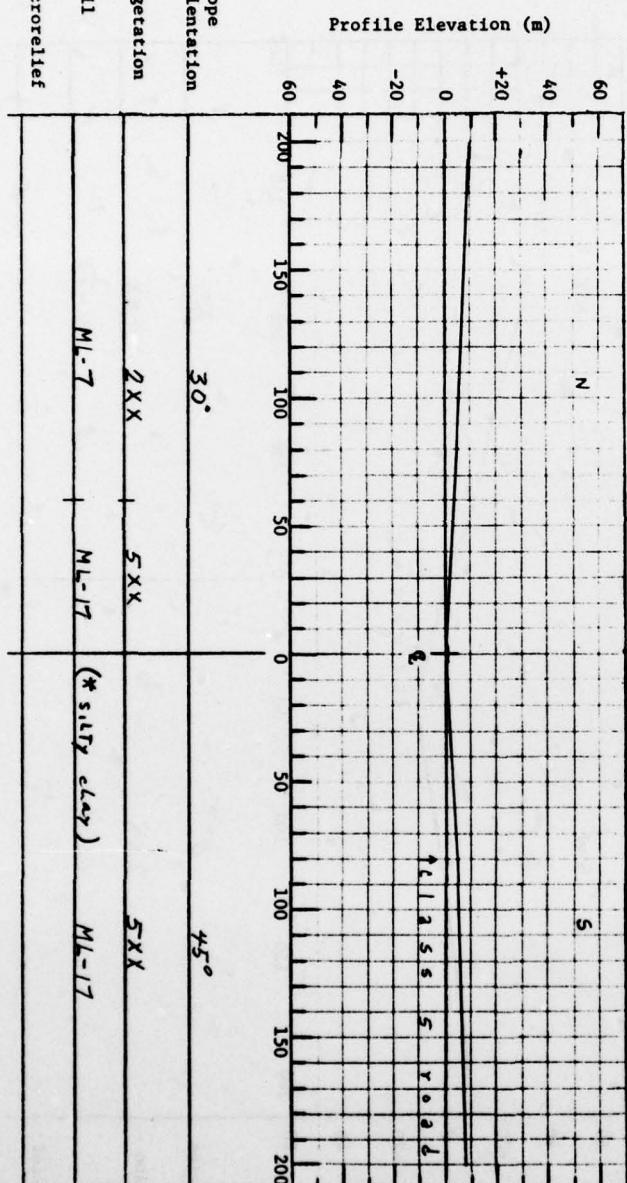
E

W

Construction:	Width (m)	Traffic Surface Material	Thickness (cm)	Shoulder Width (m)	Material
*	3.5 m, ~1k. puts	Soil			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

* from field observations Aug 1974



Slope Orientation

30°

45°

Vegetation

2XX

5XX

5XX

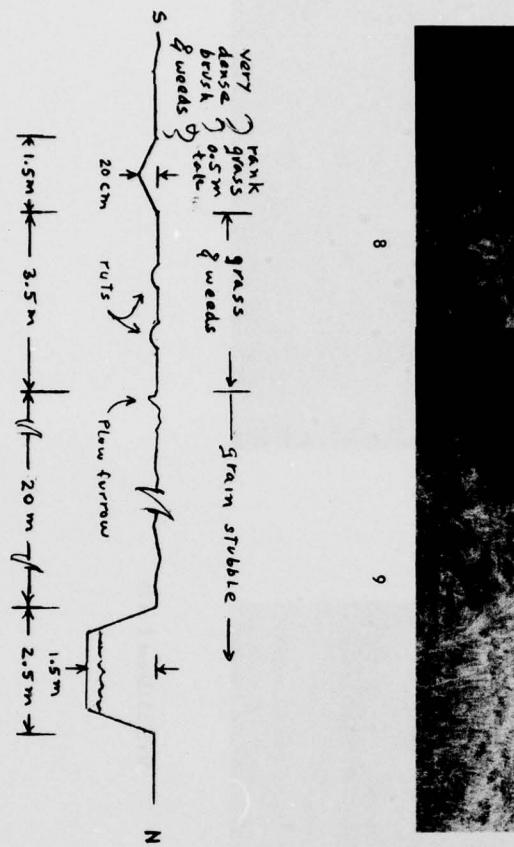
Soil

ML-7

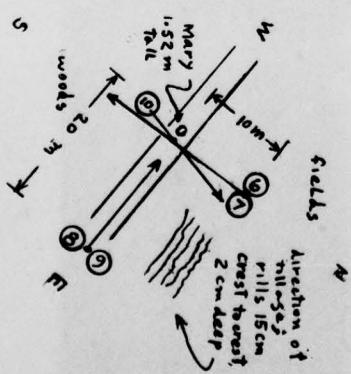
ML-17
(* similar class)

ML-17

Microrelief

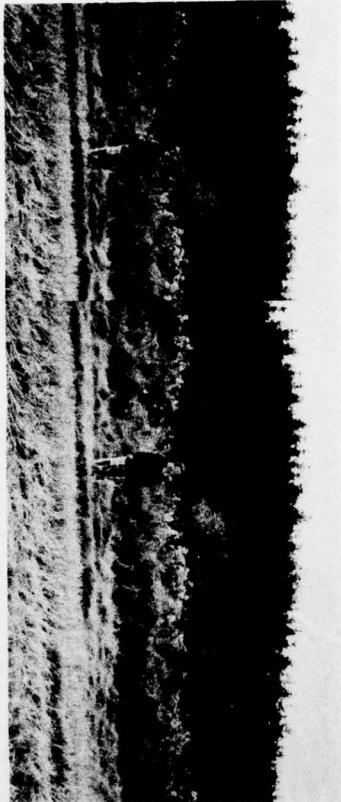


SITE 53 (Sheet 1 of 2)



A76

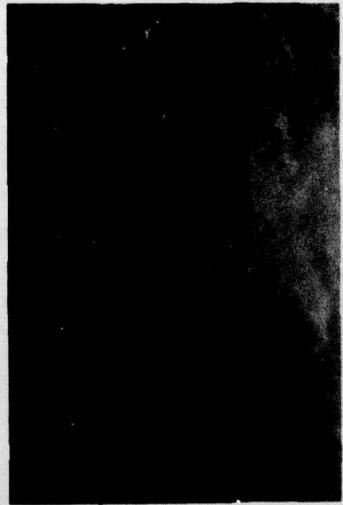
SITE 53 (Sheet 2 of 2)



7

6

10



Sample Number: 54

Date: 6 Sept 74

Notes and Comments:

Map Number: L 5518 Scale: 1:50000

Coordinate Location: Geographic: 50°34'03"N UTM Ref.: 08°56'49"E

Landscape: Cultivated
upland

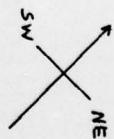
Road: Class: 4

Direction: NW

Site Type: 3

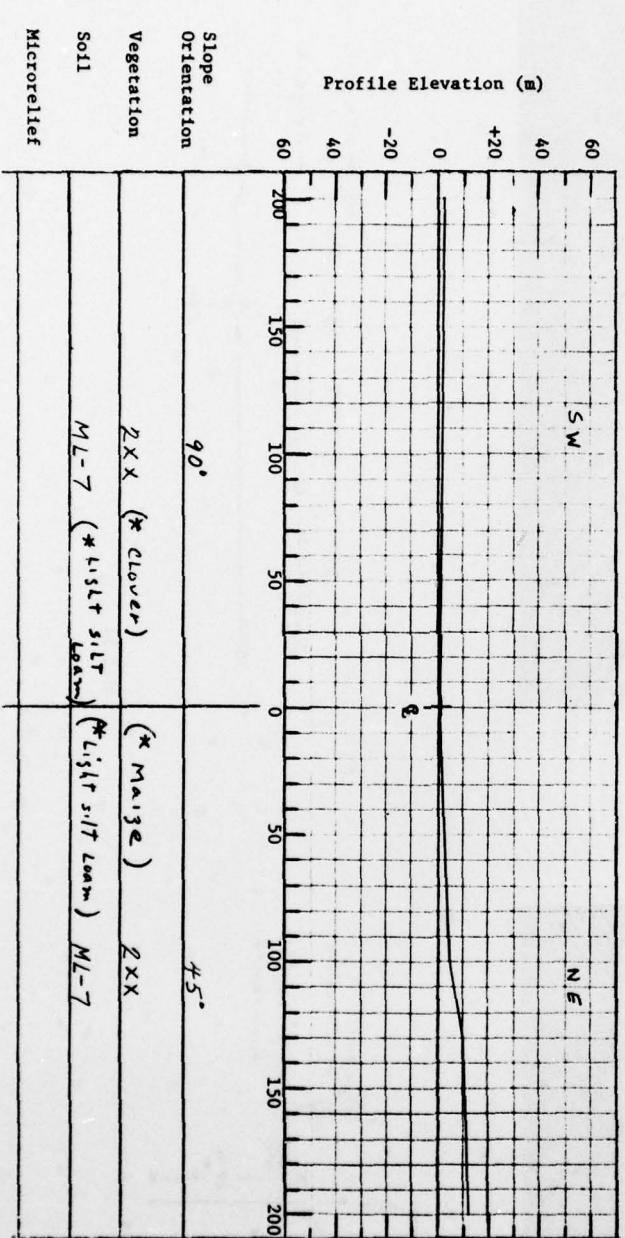
Construction:

Width (m)	Traffic Surface Material	Thickness (cm)	Shoulder Width (m)	Material
* 2.5	Metalled			
Base				
Subbase				



Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

* field observation, Aug 1974



SITE 54 - PROFILE DATA

AD-A046 157 ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS F/6 19/1
DESCRIPTION OF TERRAIN TO BE USED IN EVALUATING THE LOFTED MINE--ETC(U)
SEP 77 E E ADDOR, E E GARRETT

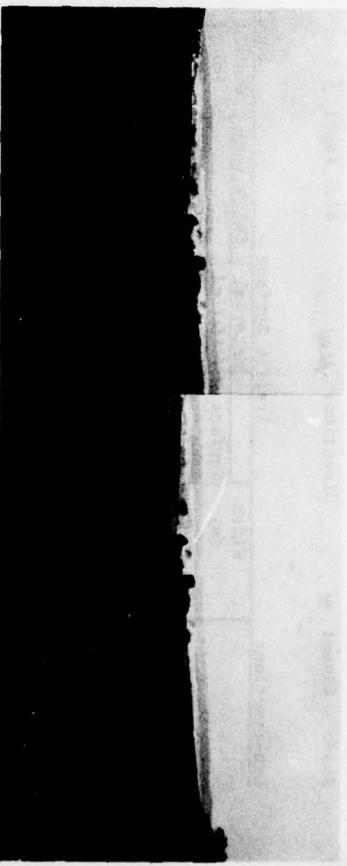
UNCLASSIFIED

WES-MP-M-77-11

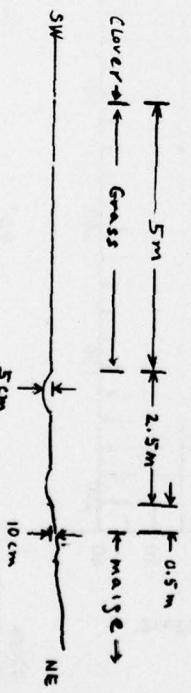
NL

2 OF 2
AD
A046157

END
DATA
FILED
12-74
DDC

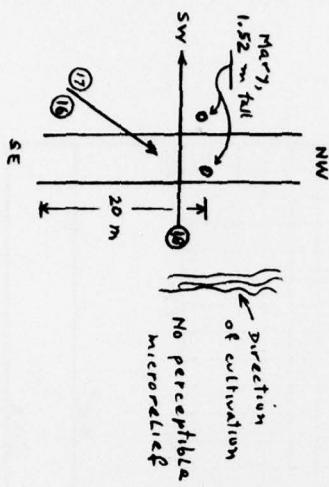


16



SITE 54

A78



18

16

Sample Number: 55

Date: 6 Sept 74

Map Number: L 5518

Scale: 1:50000

Coordinate Location:

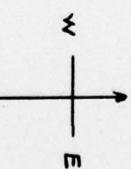
Geographic: 50°34'23"N UTM Ref.:
08°57'24"E

Landscape: Pasture
Soil
Road: Class: 2

Direction: N

Site Type: 1

Notes and Comments:



Construction:	Width (m)	Traffic Surface Material	Thickness (cm)	Shoulder Width (m)	Shoulder Material
*	6	Asphalt			

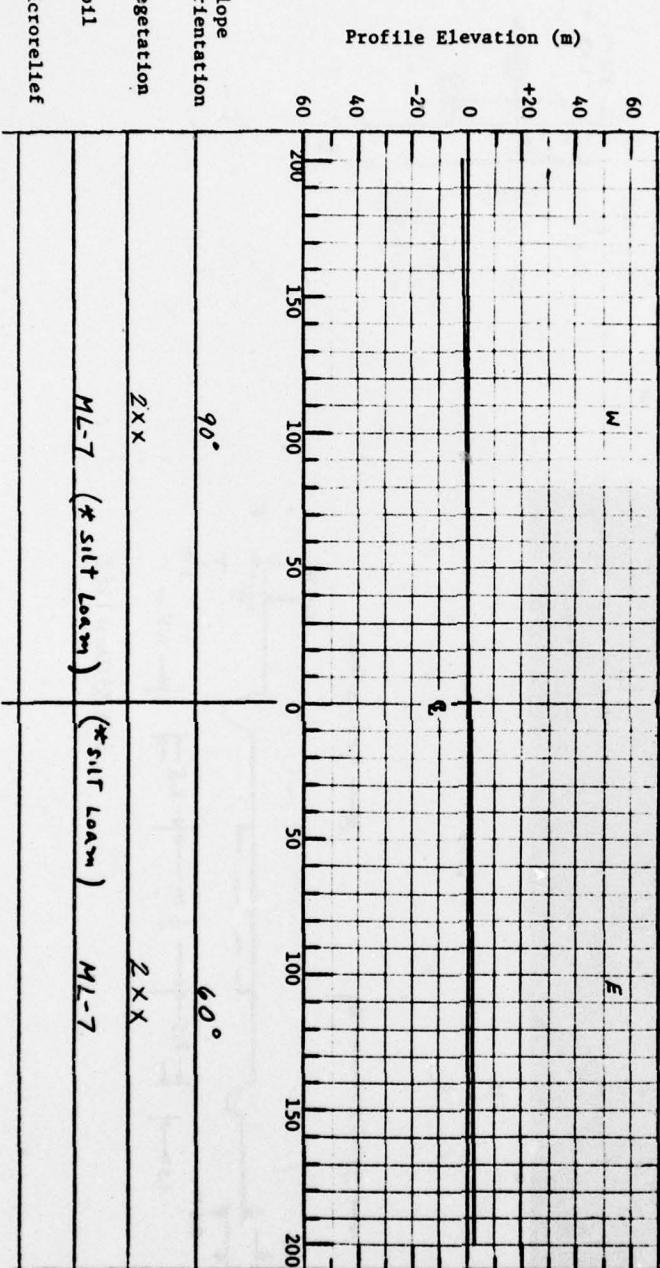
base

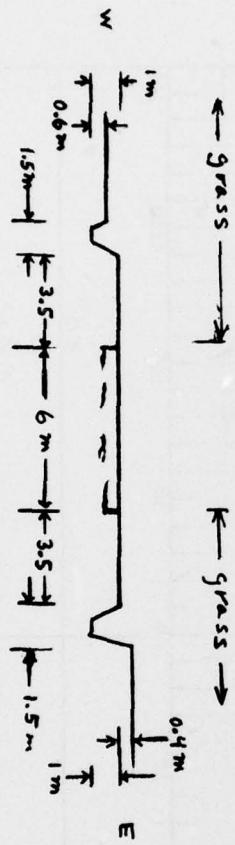
Subbase

Horizontal Distance (m)

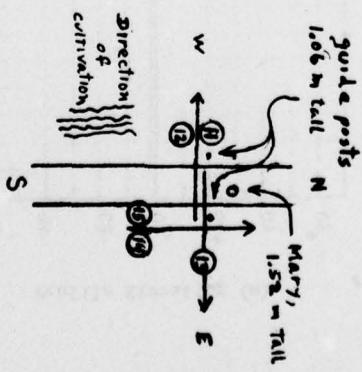
Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

* from field observation A-S 1974





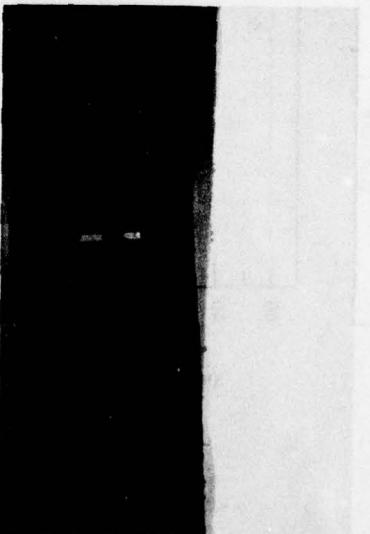
SITE 55 (Sheet 1 of 2)



11

SITE 55 (Sheet 2 of 2)

13



12



A81

Sample Number: 56

Date: 6 Sept 74

Notes and Comments:

Map Number: L 5518 Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}34'48''N$ $95^{\circ}07'E$

Landscape: Cut/treated
valley bottom

Road: Class: 3

Direction: NW

Site Type: 4

SW
NE

Construction:

Width (m)	Traffic Surface Material	Surface Thick (cm)	Width (m)	Shoulder Material
*	Asphalt			

*

6

Base

Subbase

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

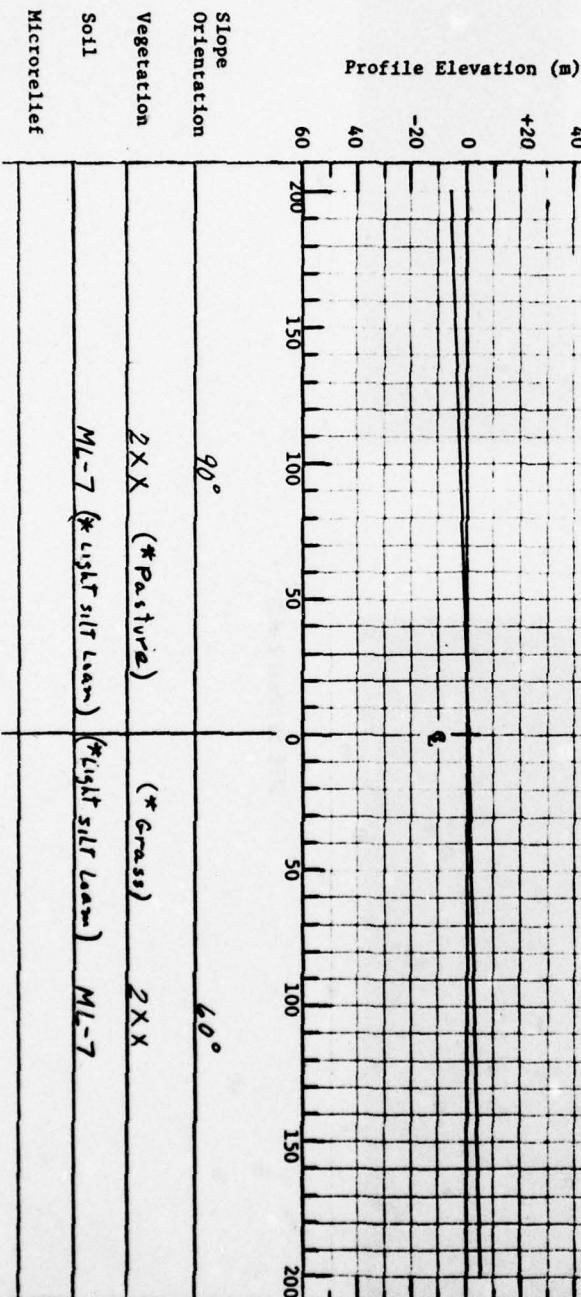
* Field observation Aug 1974

Horizontal Distance (m)



N

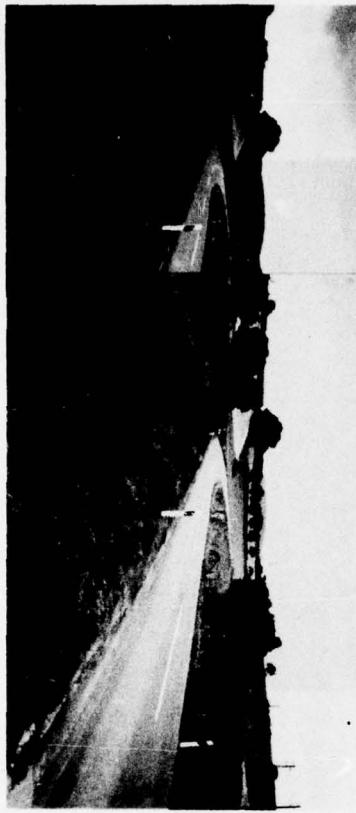
S



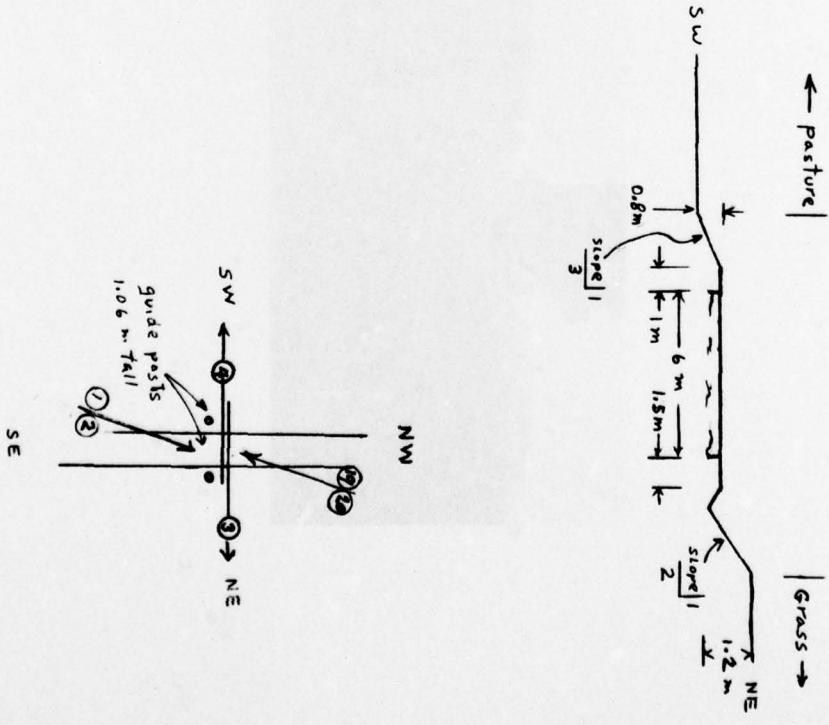
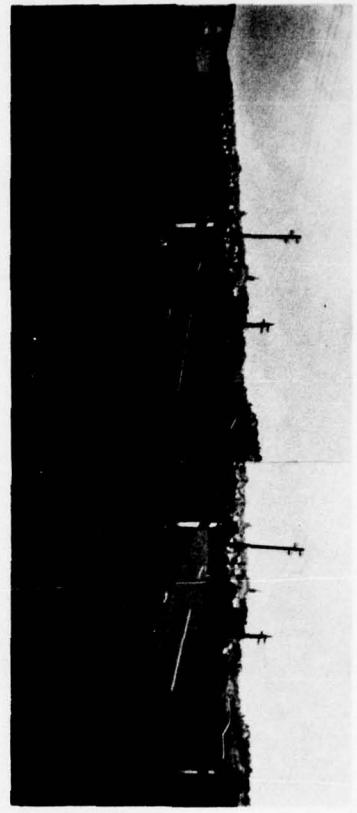
SITE 56 (Sheet 1 of 2)

A83

20
19

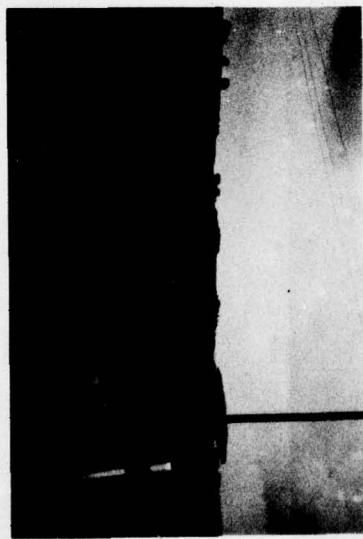


1
2





SITE 56 (Sheet 2 of 2)



A84

Sample Number: 57

Date: 6 Sept 74

Notes and Comments:

Map Number: 5421

Scale: 1:25000

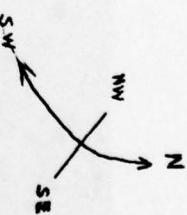
Coordinate Location: Geographic: 50°33'00"N UTM Ref.:

Landscape: Marley and
forested lowland

Road: Class: 4

Direction: NE

Site Type: 4



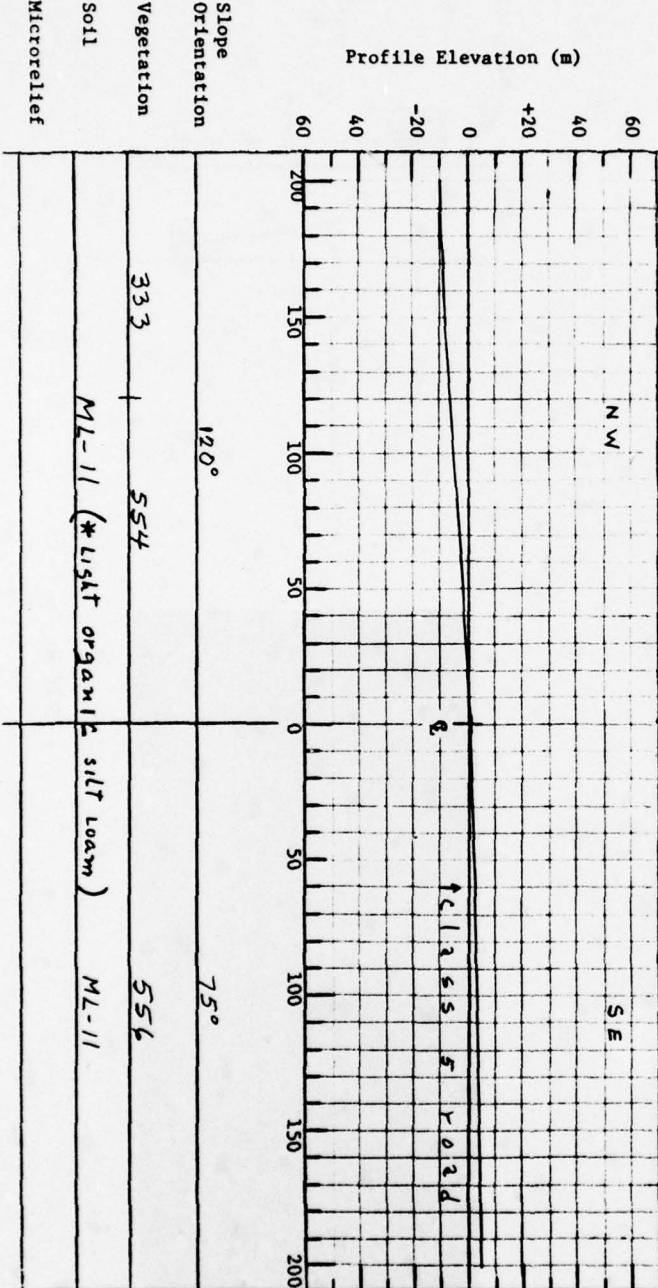
Construction:

Width (m)	Traffic Surface		Shoulder	
	Material	Thick (cm)	Width	Material
* 2.5	Metallic			
	Base			
	Subbase			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

* from field observation, Aug 1974

Horizontal Distance (m)



Slope Orientation

120° 75°

Vegetation

333

554

556

Soil

ML-11 (*light organic silt loam)

ML-11

Microrelief



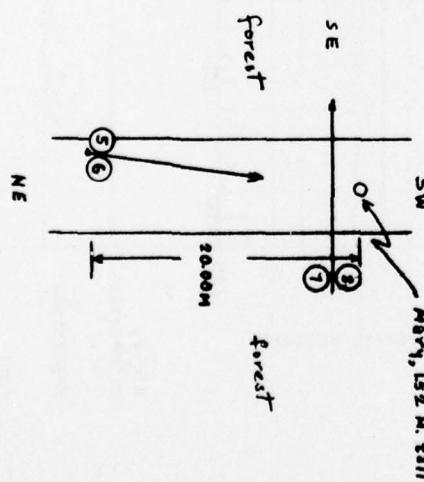
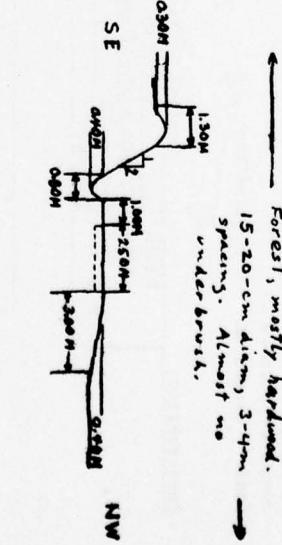
7

8



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6



SITE 57

A86

Sample Number: 58

Date: 6 Sept 74

Notes and Comments:

Map Number: 5421

Scale: 1:25000

SW NE

Coordinate Location:

Geographic: $50^{\circ}33'00''N$ UTM Ref.:

Landscape: Forested hill

09 $^{\circ}$ 15'32"E

Road: Class: 5

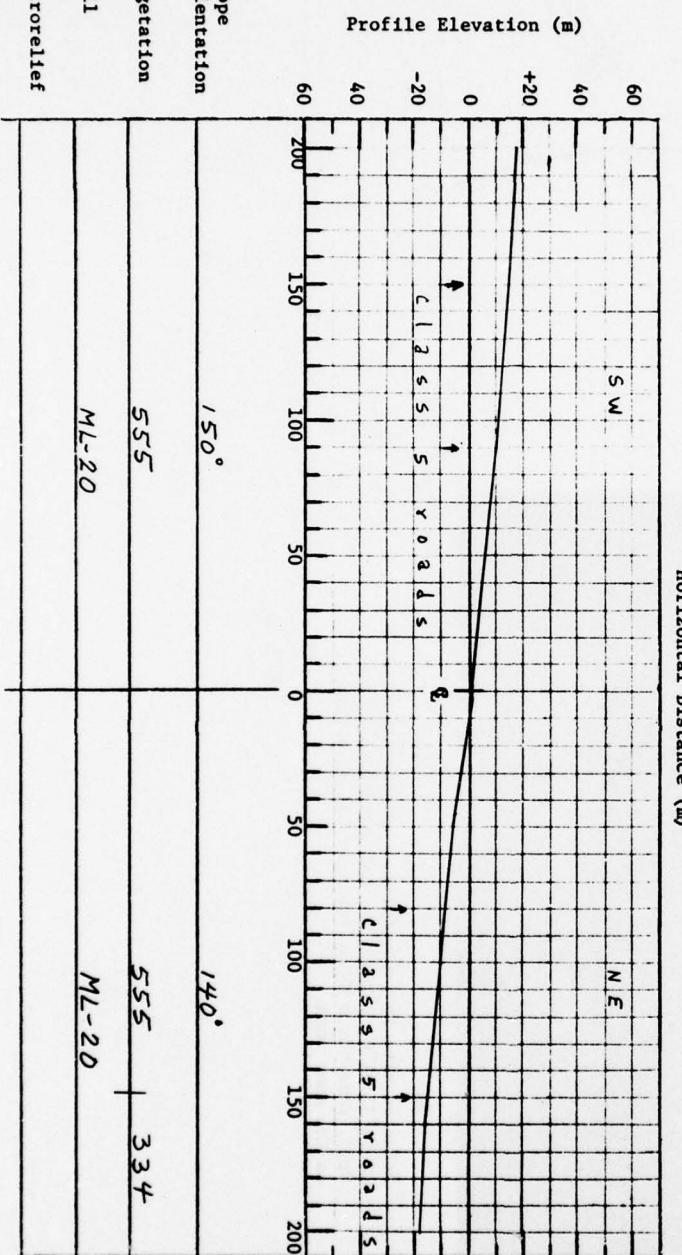
Direction: NW

Site Type: 4

Construction:

Width (m)	Traffic Surface Material	Thickness (cm)	Shoulder Width (m)	Material
	Surface			
	Base			
	Subbase			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



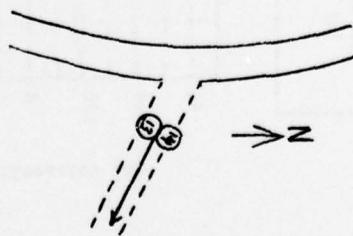


14

13

Selected site is inaccessible. Photographs are at $50^{\circ}33'11''N$, $9^{\circ}15'50''E$ (UTMG coordinates 180 019), some 500 m NW of the selected site but on the same road.

SITE 58



A88

Sample Number: 59

Date: 6 Sept 74

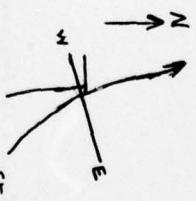
Notes and Comments:

Map Number: 5421 Scale: 1:25000

Coordinate Location: Geographic: $50^{\circ}33'00''N$ UTM Ref.: $09^{\circ}18'04''E$

Landscape: Cultivated
Side: N/S

Road: Class: 2 Direction: NW Site Type: 4



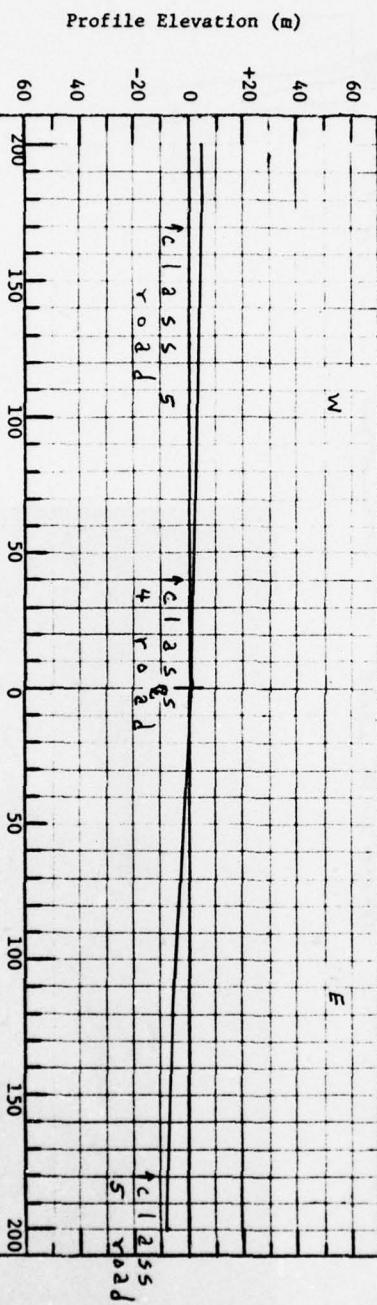
Construction:

Width (m)	Traffic Surface		Shoulder Material
	Surface *	Material	
* 6	Blacktop		

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

* field observation, Aug 1974



Slope Orientation: 60° 120°

Vegetation: $2 \times X$ (*Grain)

(*Grain) $2 \times X$

Soil: ML-5 (Light silty loam)

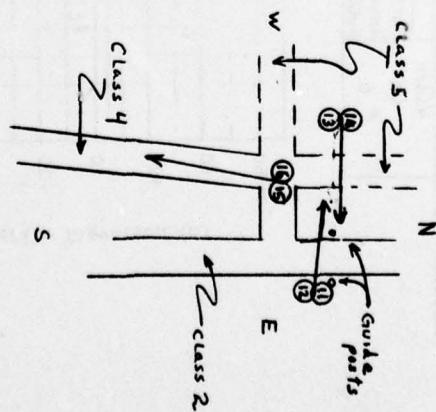
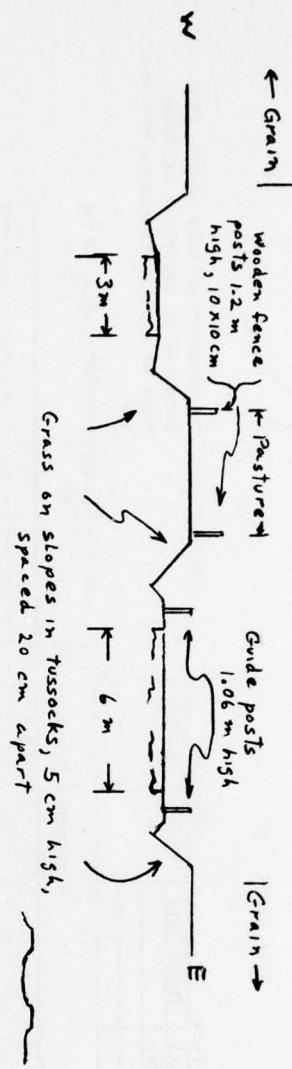
(*Light silty loam) ML-5

Microrelief



15

SITE 59 (Sheet 1 of 2)



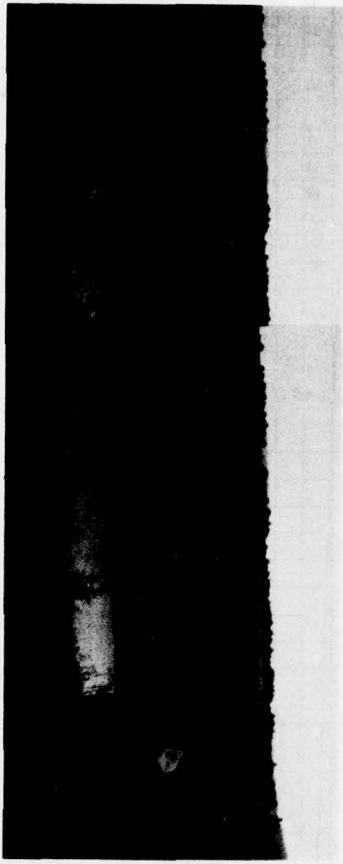
A90

16



12

11



14

13

SITE 59 (Sheet 2 of 2)

A91

Sample Number: 60

Date: 6 Sept 74

Notes and Comments:

Map Number: 5421

Scale: 1:25000

Coordinate Location

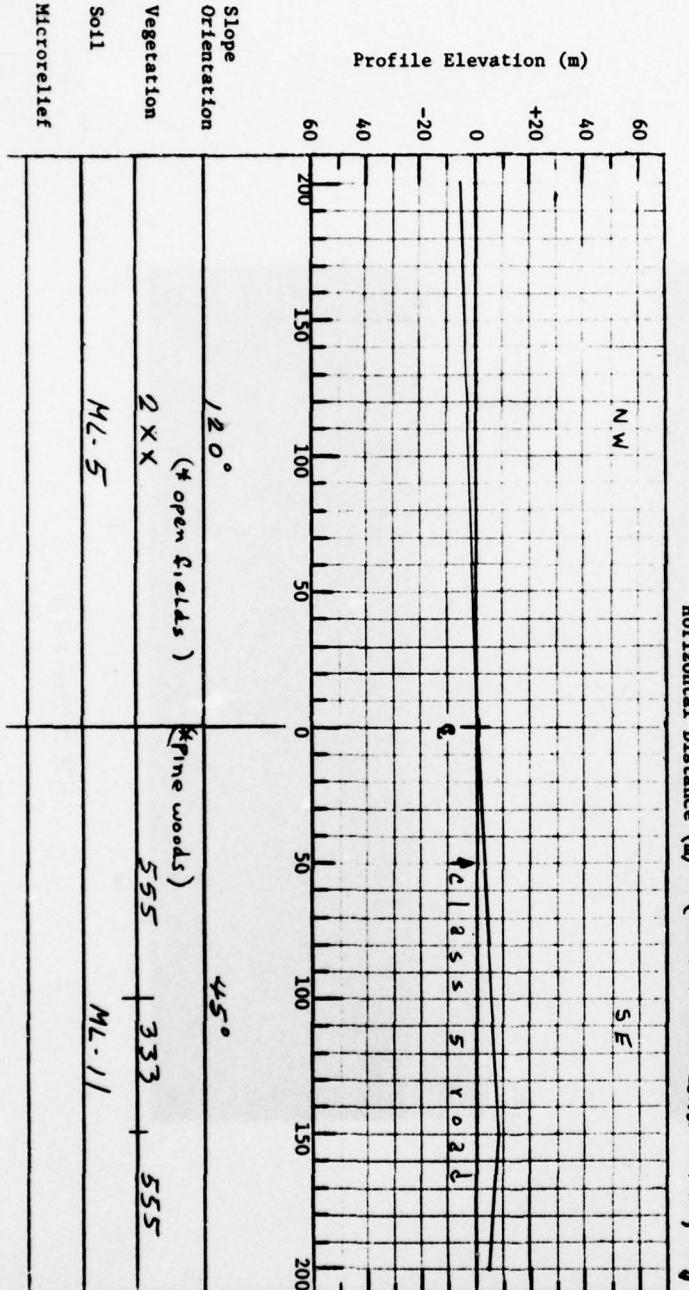
Geographic: $50^{\circ}33'14''N$ UTM Ref.:
 $79^{\circ}19'15''E$

Landscape: Pasture
Road: Forest Hill side Class: 3 Direction: NNE Site Type: 4

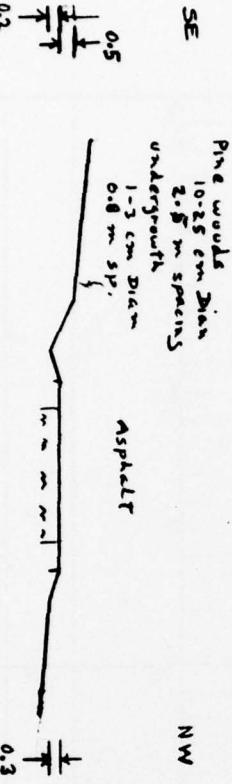
Construction:		Traffic Surface	Shoulder	
Width (m)	Material	Thick (cm)	Width (m)	Material
Surface*	Asphalt			
Base				
Subbase				

Horizontal Distance (m) (Road under construction, Aug 1974)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

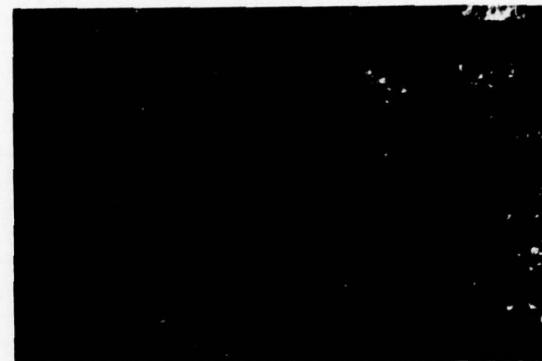
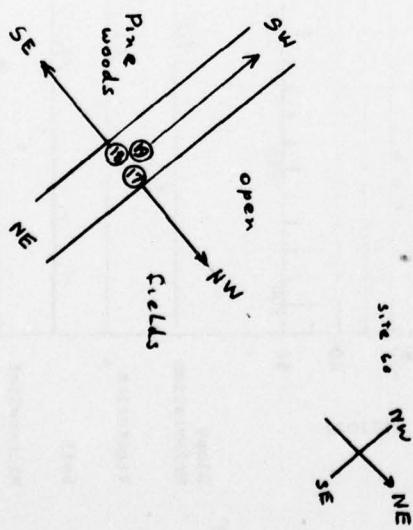


SITE 60 - PROFILE DATA



SITE 60

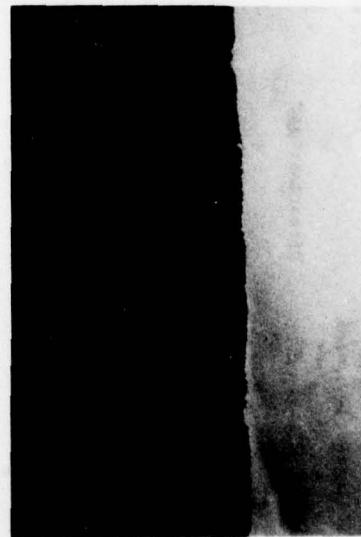
A93



18



19



17

Notes and Comments:

Sample Number: 61

Scale: 1:25000

Date: 7 Sept 74

Map Number: 5423

Coordinate Location:

Landscape: Cut/filled
hillsides

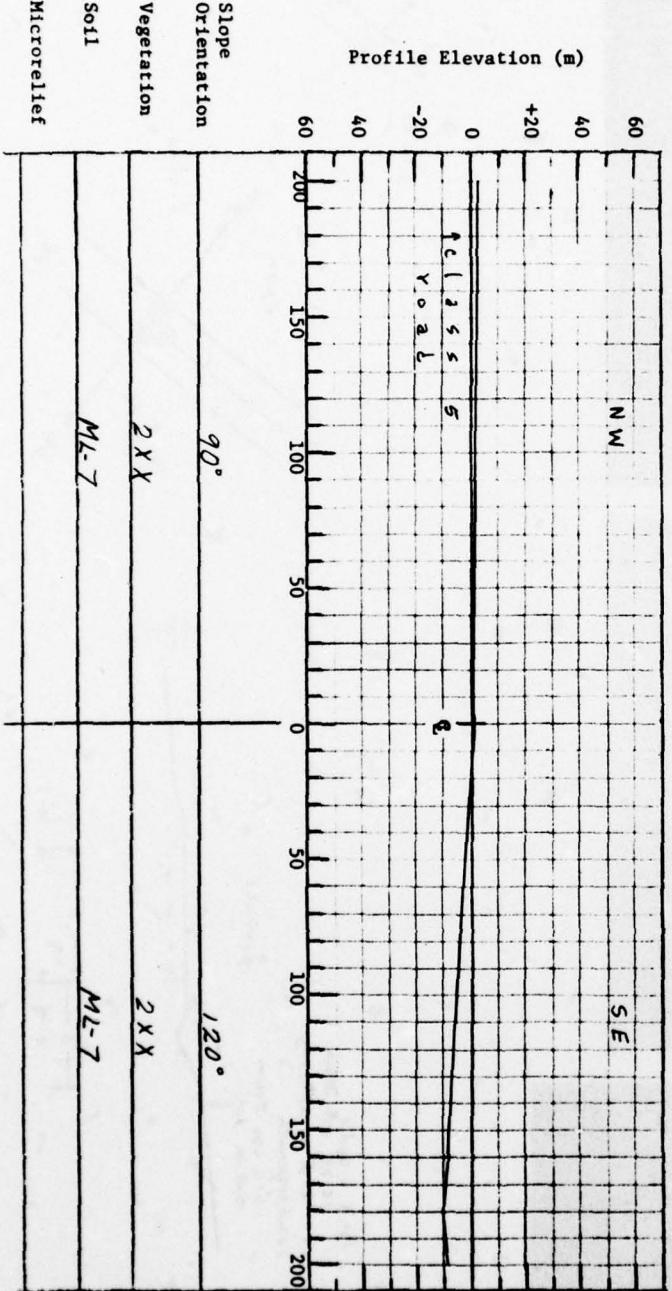
Geographic: $50^{\circ}33'05''N$ $09^{\circ}35'00''E$

Road: Class: 5

Direction: NE Site Type: 4

Construction:		Traffic Surface		Shoulder	
Width (m)	Material	Thickness (cm)	Width (m)	Material	
	Surface				
	base				
	Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



SITE 61 - PROFILE DATA

A94

Sample Number: 62

Date: 7 Sept 74

Map Number: 5423 Scale: 1:25000

Coordinate Location: Geographic: $50^{\circ}35'42''N$ UTM Ref.: $09^{\circ}35'00''E$

Landscape: Forested slope
cut/treed h/w side

Road: Class: 3 Direction: E Site Type: 3/2

Notes and Comments:



Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Material	Thick (cm)	Width (m)		
	Surface				
	Base				
	Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)

Profile Elevation (m)

60
40
+20
0
-20
40
60

-200
-150
-100
-50
0
50
100
150
200

N S E

Slope Orientation: 90° 120° 30°

Vegetation

XXX

XXX

XXX

Soil

ML-1/2

ML-3

ML-3

Microrelief

SITE 62 - PROFILE DATA

A95

Sample Number: 63

Date: 7 Sept 74

Notes and Comments:

Map Number: 5425

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}33'00''N$ UTM Ref.:
 $09^{\circ}55'00''E$

Landscape: Forested
Hillside

Road: Class: 4

Direction: NW Site Type: 4

Construction:

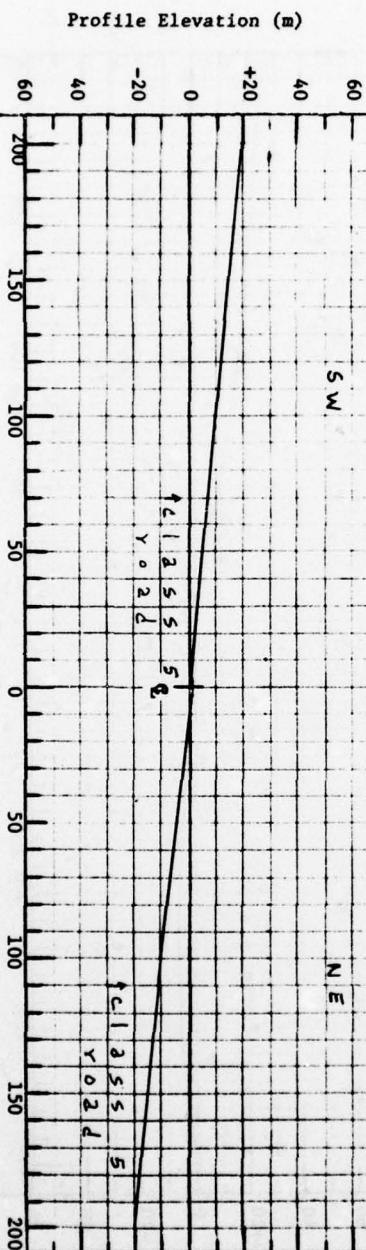
Width (m)	Traffic Surface			Shoulder Material
	Material	Thick (cm)	Width (m)	
	Surface			
	Base			
	Subbase			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)

NW

NE



Slope Orientation

60°

130°

Vegetation

4XX

4XX

Soil

ML-13

ML-13

Microrelief

Sample Number: 64

Date: 7 Sept 74

Notes and Comments:

Map Number: 5425 Scale: 1:25000

Coordinate Location: Geographic: $50^{\circ}33'20''$ UTM Ref.: $D9^{\circ}55'28''$

Landscape: *Forested*

Road: Class: 5

Direction: NE

Site Type: 1/4

Construction:

Width (m)	Traffic Surface Material	Thickness (cm)	Shoulder Width (m)	Shoulder Material
	Surface			
	Base			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)

60

40

+20

0

-20

40

60

200

150

100

50

0

50

100

150

200

SE

E

NE

NW

Profile Elevation (m)

95 ± 2.2 m

90° 90° 150°

Slope Orientation

Vegetation

Soil

Microrelief

Date: 9 Sept 74

NOTES AND COMMENTS

Map Number: 5425

Scale: 1:2500

Coordinate Location: Geographic: 50°33'34"N UTM Ref.:

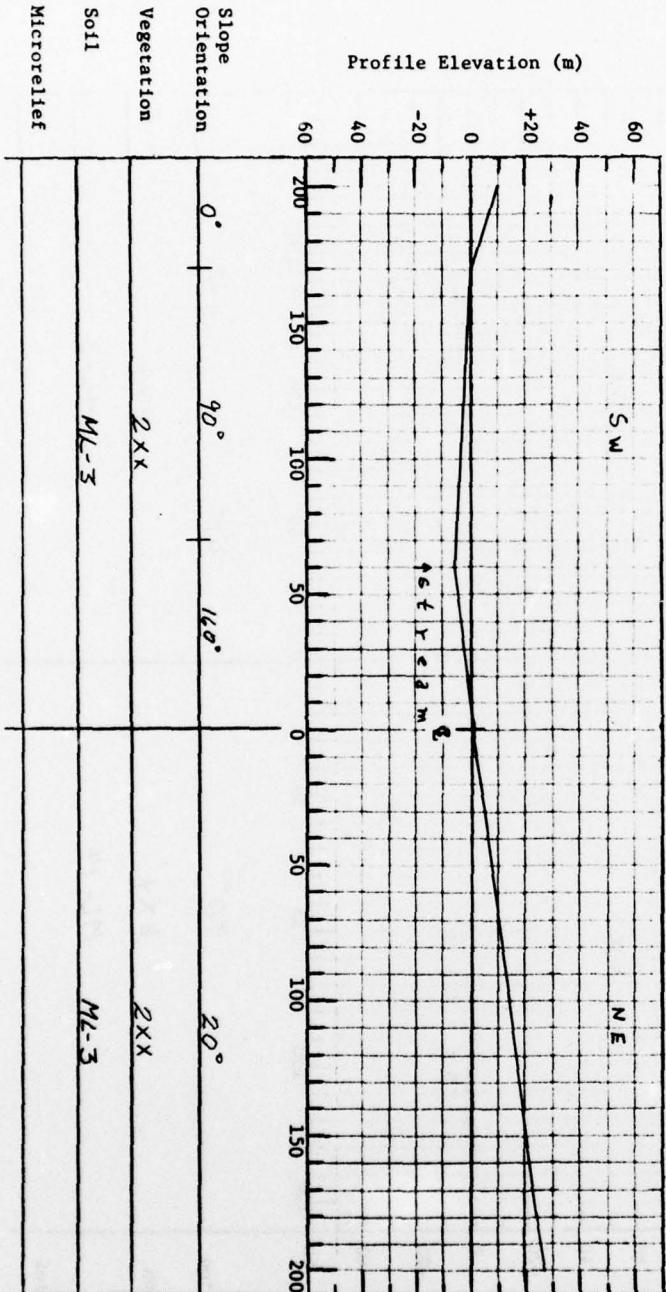
Landscape: Bestare

三、四〇、七五、六〇

Road: Class: 3 Direction: NW Site Type: 3

Construction:	Traffic Surface			Shoulder Material
	Width (m)	Material	Thick (cm)	
	Surface			
	Base			
	Subbase			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Microrelief

YEGEELA LOW

Soil

Microrelief

Sample Number: 66

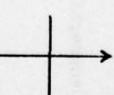
Date: 9 Sept 74

Notes and Comments:

Map Number: 5425 Scale: 1:25000

Coordinate Location: Geographic: $50^{\circ}35'33''N$ UTM Ref.: $09^{\circ}59'13''E$

Landscape: *Pasture Valley bottom and forested hillside*
Road: Class: 2 Direction: N Site Type: 3



Construction:

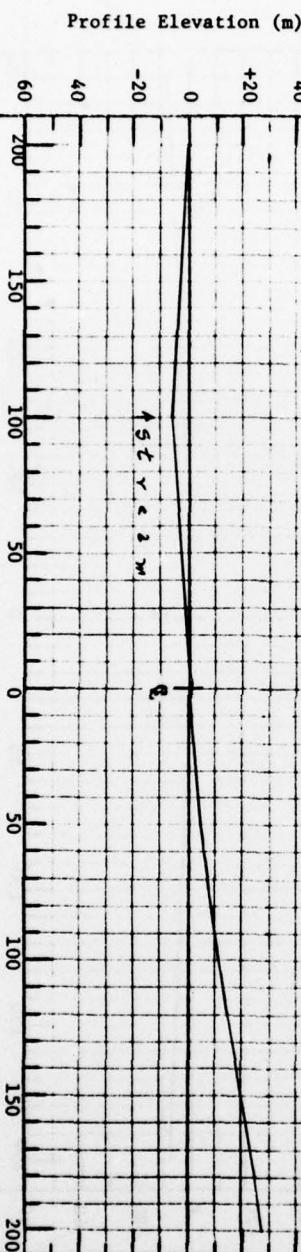
Width (m)	Traffic Surface		Shoulder Width (m)	Material
	Surface	Material		
Subbase				

Horizontal Distance (m)

W.

E.

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation
Vegetation
Soil
Microrelief

0°

190°

0°

2XX

4X

OL-4

ML-14

Sample Number: 67

Date: 9 Sept 74

Map Number: L 5714

Scale: 1:50000

Coordinate Location:

Geographic: 50°21'09"N UTM Ref.:

Landscape: *Forested and
Cultivated upland*

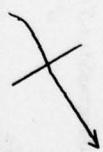
08°15'00"E

Road: Class: 3

Direction: NE

Site Type: 2

Notes and Comments:

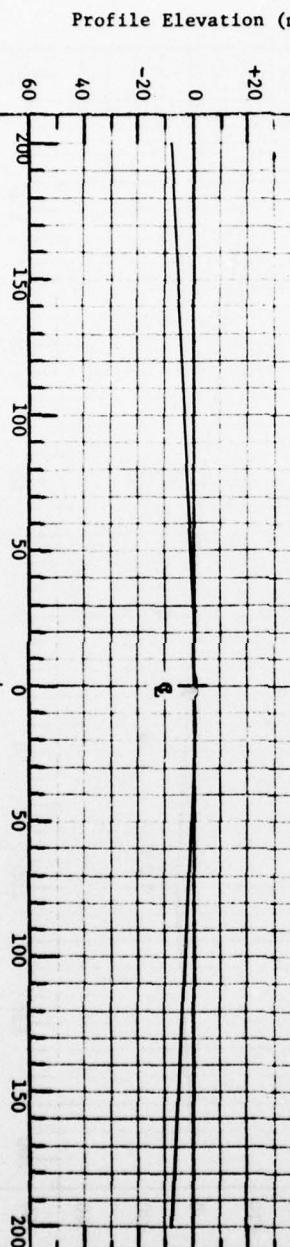


Construction:

Width (m)	Traffic Surface		Shoulder Width (m)	Material
	Surface	Base		
		Subbase		

Horizontal Distance (m)

Instruction: On transect profile sketch show
location of important features,
such as stream crossings, ditches,
etc.



Slope Orientation

150°

45°

Vegetation

XXX

XXX

Soil

ML-6

ML-6

Microrelief

Sample Number: 68

Map Number: L 5714

Date: Sept 74

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}21'42''N$ UTM Ref.:
 $08^{\circ}15'00''E$

Landscape: Forested area

Soil: $\text{d}_{10} = 2.4 \text{ mm}$

Road: Class: 5

Direction: NW Site Type: 3

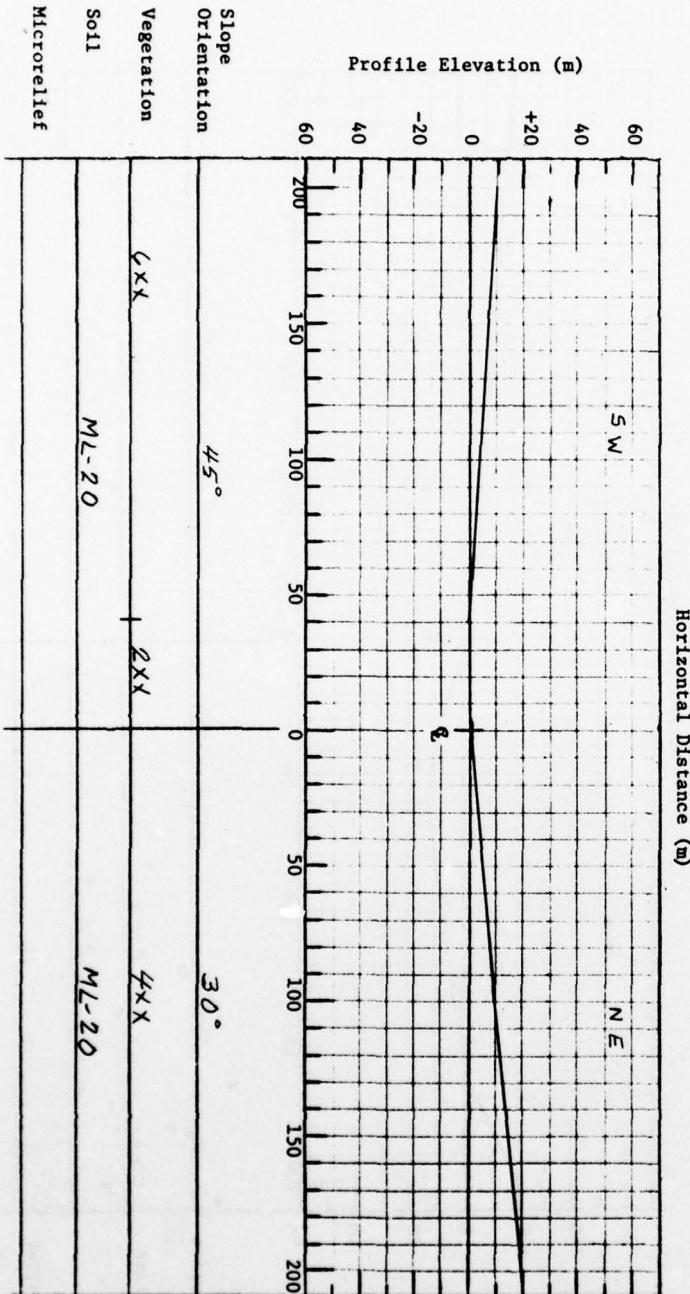
Notes and Comments:



Instruction:

On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Construction:		Traffic Surface			Shoulder	
Width (m)	Material	Thick (cm)	Width (m)	Material	etc.	
Surface			Base			
Subbase						



Sample Number: 69

Date: 9 Sept 74

Map Number: L 5714

Scale: 1:50000

Coordinate Location:

Geographic: 50°22'30"N UTM Ref.: 08°15'00"E

Landscape: Forested and
Cultivated valley

Road: Class: 2 Direction: NW Site Type: 3

Notes and Comments:

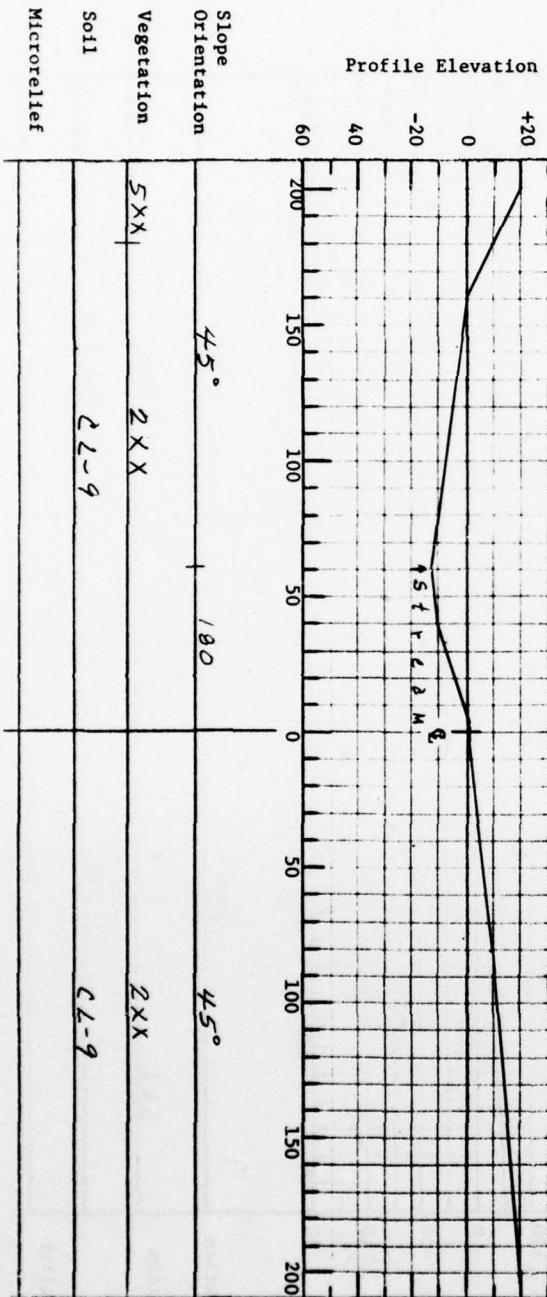


Construction:

Width (m)	Traffic Surface Material	Shoulder Width (m)	Material
Surface	Base	etc.	
Subbase			

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Sample Number: 70

Date: 9/5/74

Map Number: L 5716

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}21'00''N$ UTM Ref.:

Landscape: Forested land
cut, paved
village

Road: Class: 3

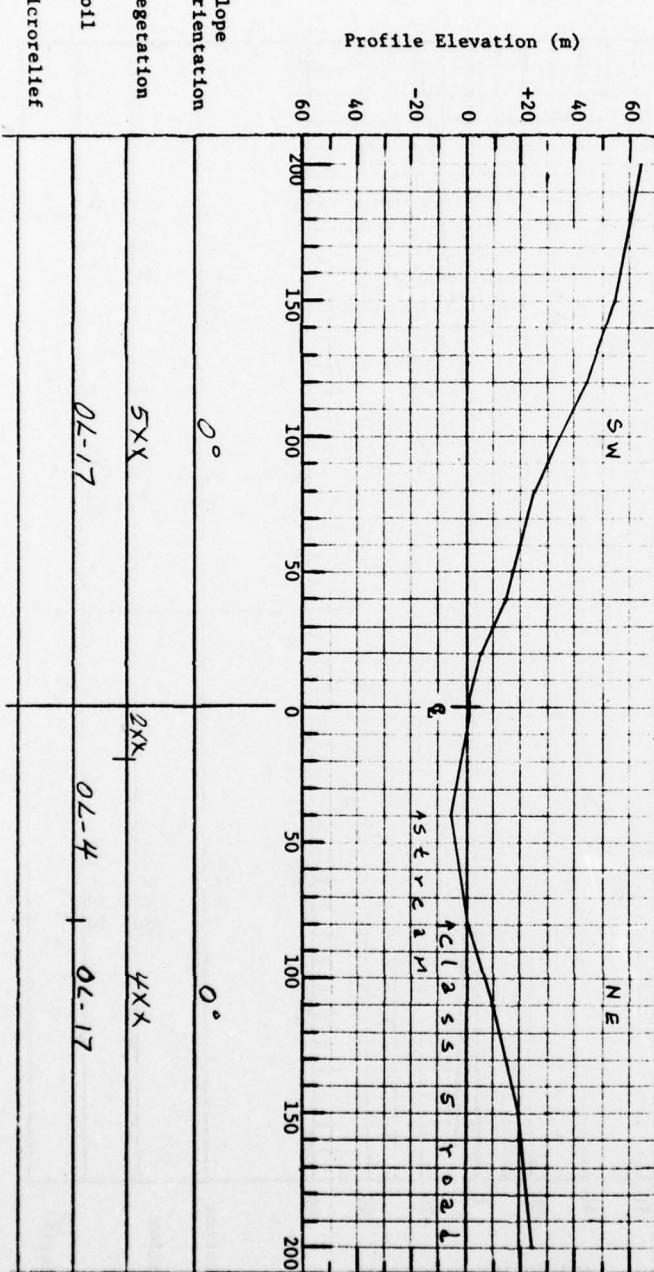
Direction: NW Site Type: 3

Notes and Comments:

On transect profile sketch show
location of important features,
such as stream crossings, ditches,
etc.

Construction:		Traffic Surface		Shoulder	
Width (m)	Material	Thick (cm)	Width (m)	Material	
Surface					
Base					
Subbase					

Horizontal Distance (m)



Slope Orientation

0°

Vegetation

5XX

2XX

4XX

Soil

OL-17

OL-4

OL-17

Microrelief

Notes and Comments:

Sample Number: 71 Date: 9 Sept 74

Map Number: L5716 Scale: 1:50000

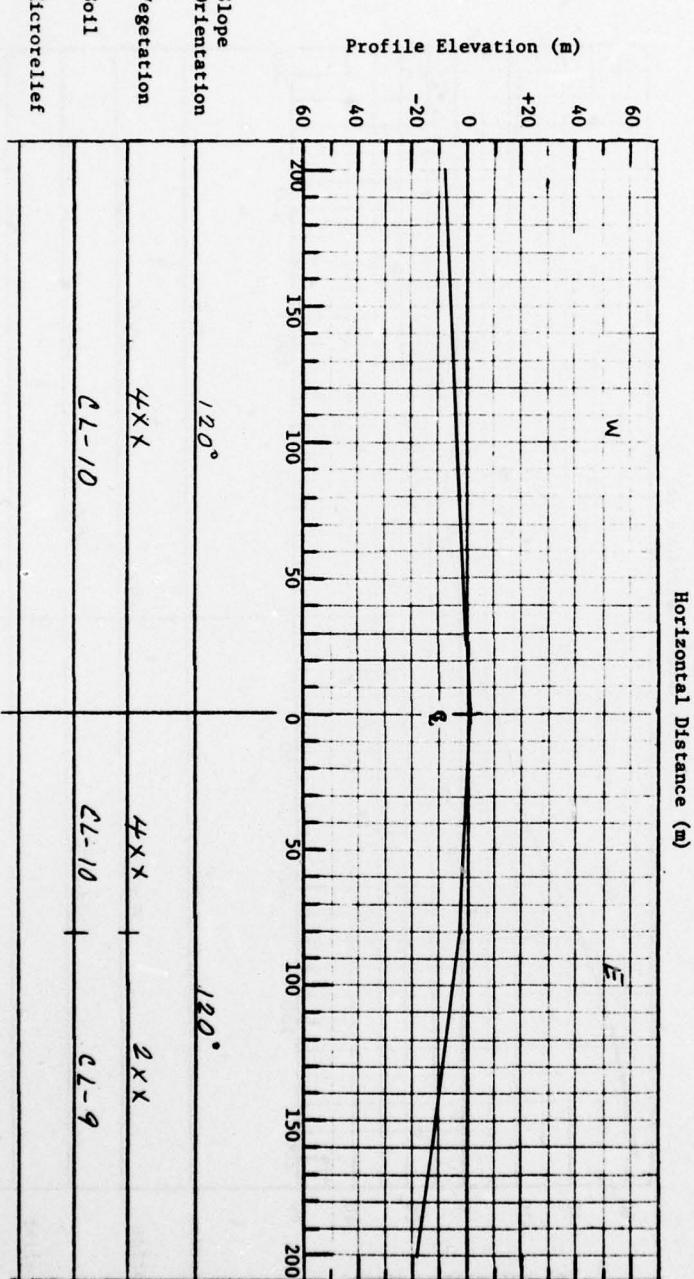
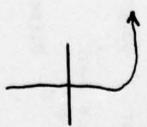
Coordinate Location: Geographic: $50^{\circ}21'00''N$ UTM Ref.: $08^{\circ}35'55''E$

Landscape: Forested and cut, vegetated hillside

Road: Class: 5 Direction: N Site Type: 2

Construction:	Traffic Surface			Shoulder	
	Width (m)	Material	Thick (cm)	Width (m)	Material
	Surface	Base	Subbase		

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Sample Number: 72

Date: 9 Sept 74

Notes and Comments:

Map Number: 5619 Scale: 1: 25000

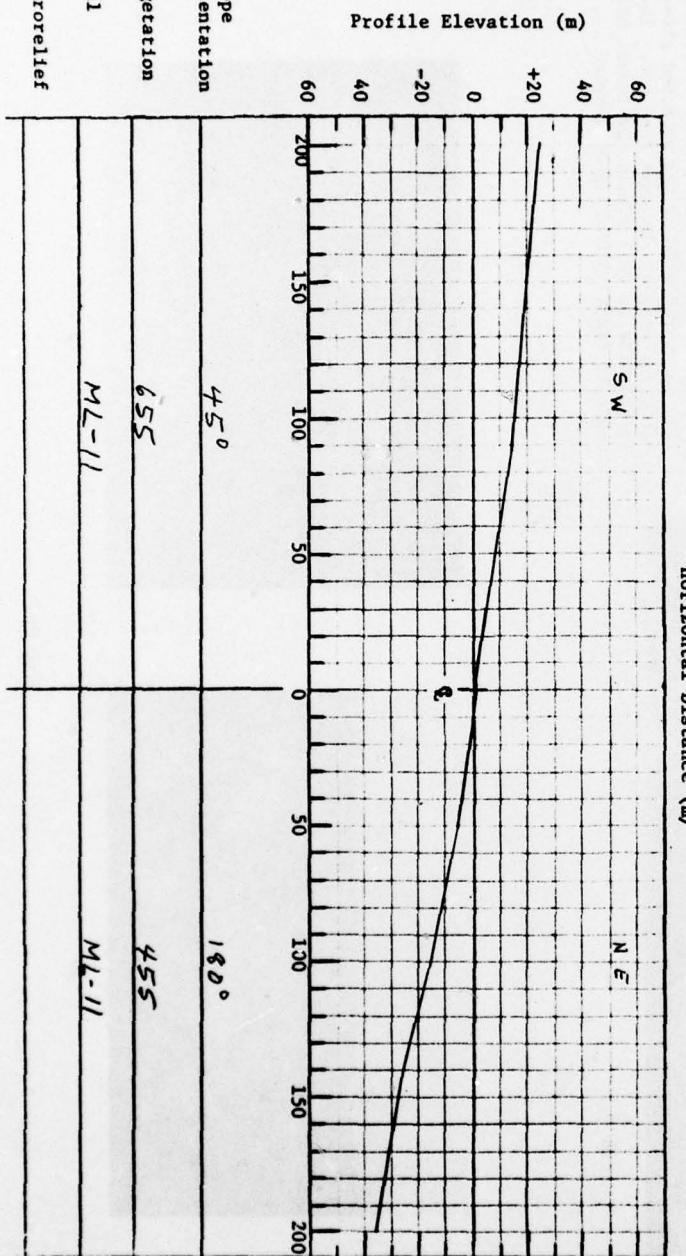
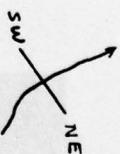
Coordinate Location: Geographic: 50°21'17"N UTM Ref.: 08°55'00"E

Landscape: *Forested upland*

Road: Class: 5 Direction: NW Site Type: 2

Construction:	Width (m)	Traffic Surface		Shoulder Material	Width (m)	Material
		Material	Thick (cm)			
		Surface				
		Base				
		Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

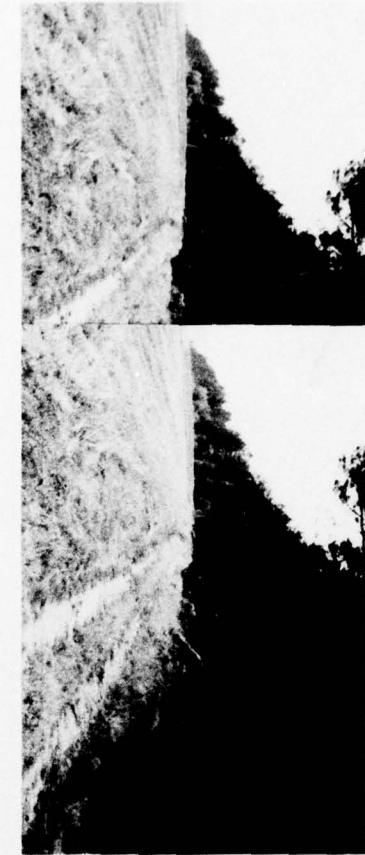
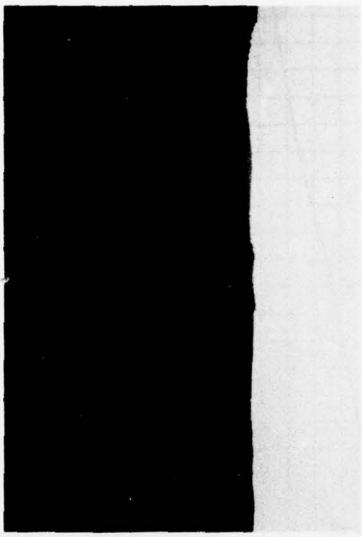




19

SITE 72

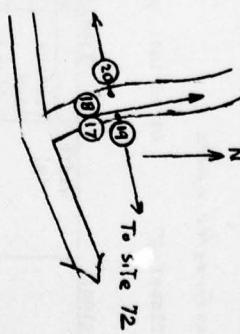
20



18

17

Selected site is inaccessible. Photographs are at $50^{\circ}20'50''N$, $08^{\circ}54'30''E$ (UTMG coordinates 936 789) about 700 m SW of the selected site, on a different road of the same road net. The selected site is well within the forest unit shown at right in these photographs.



A106

Sample Number: 73

Date: 9 Sept 74

Notes and Comments:

Map Number: 5619

Scale: 1: 25000

Coordinate Location:

Geographic: $50^{\circ}21'44''N$ UTM Ref.:
 $08^{\circ}55'00''E$

Landscape: Cut, cleared
and forested upland

Road: Class: 3

Direction: NE

Site Type: 1/4



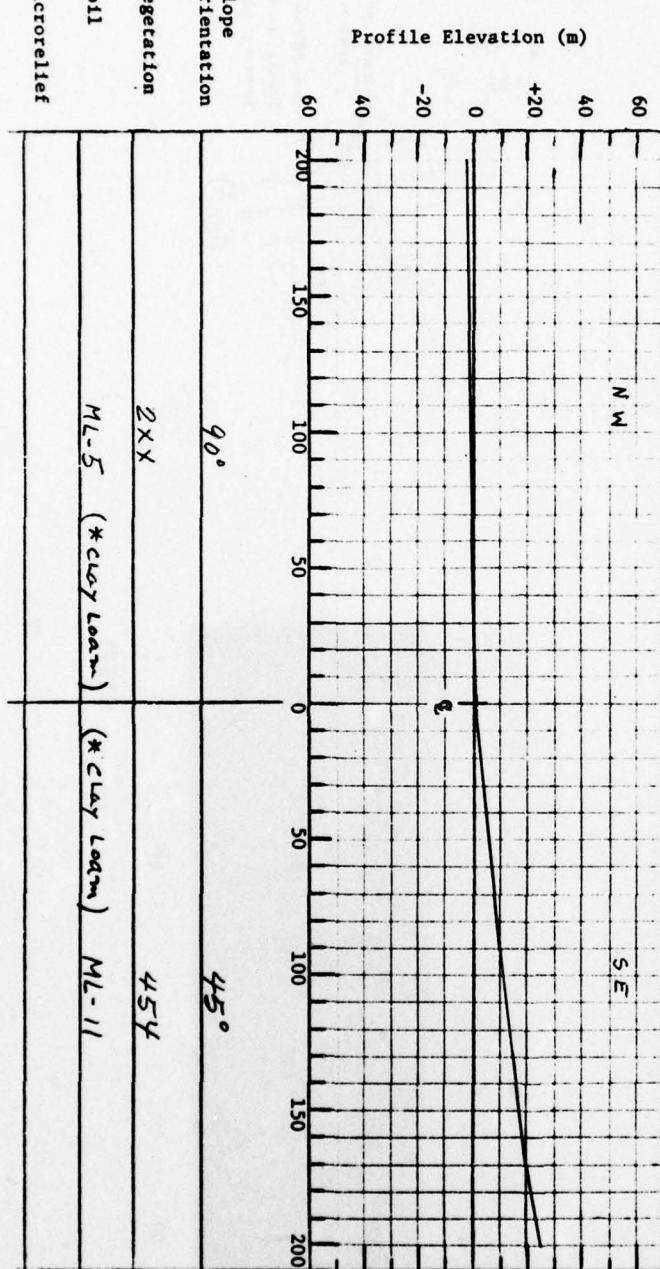
Construction:

Width (m)	Traffic Surface	Material	Thickness (cm)	Width (m)	Shoulder	Material
* 5	Surface	* Blacktop				
	Base					
	Subbase					

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)

* from field observation, Aug 1974

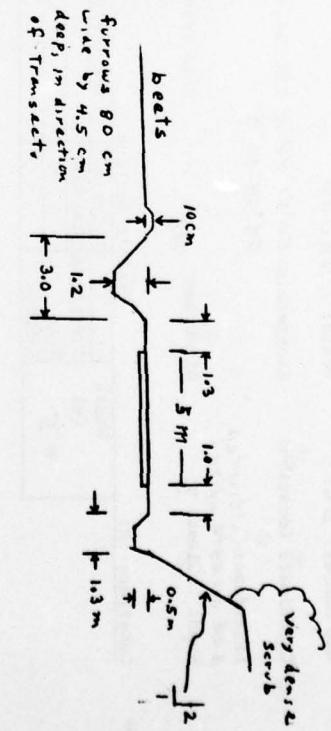


SITE 73 - PROFILE DATA

AL07



18

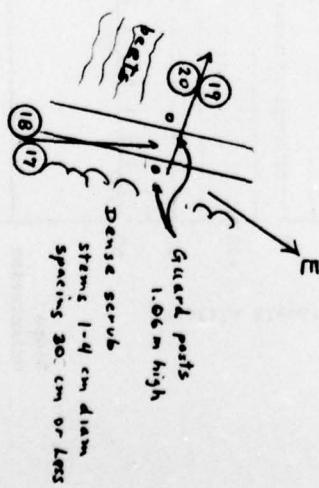


19



20

SITE 73



A108

Sample Number: 74

Date: 9 Sept 74

Map Number: 5619

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}22'34''N$ UTM Ref.:

Landscape: *Cultivated upland*

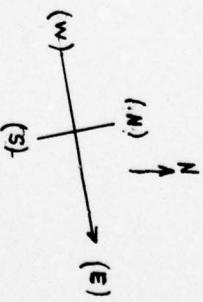
$08^{\circ}55'00''E$

Road: Class: 4

Direction: NE

Site Type: 4

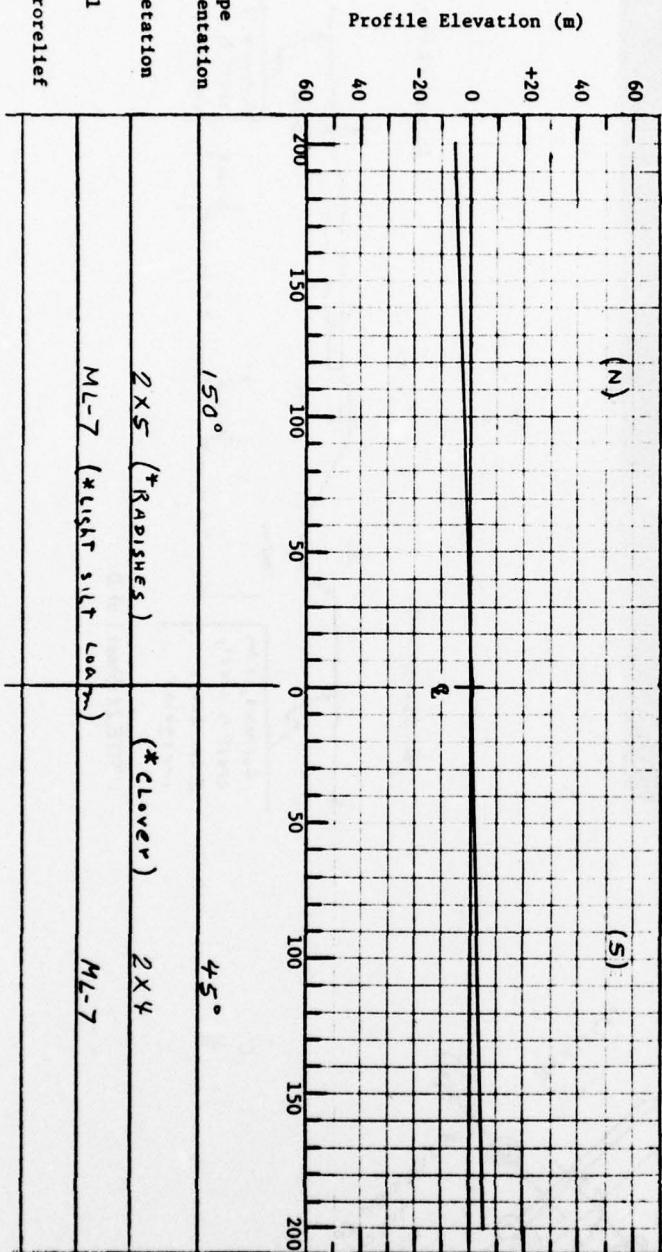
Notes and Comments:



Construction:		Traffic Surface Material	Thickness (cm)	Width (m)	Shoulder Material
Width (m)	Surface Material				
* 3	Concrete				
	Base				
	Subbase				

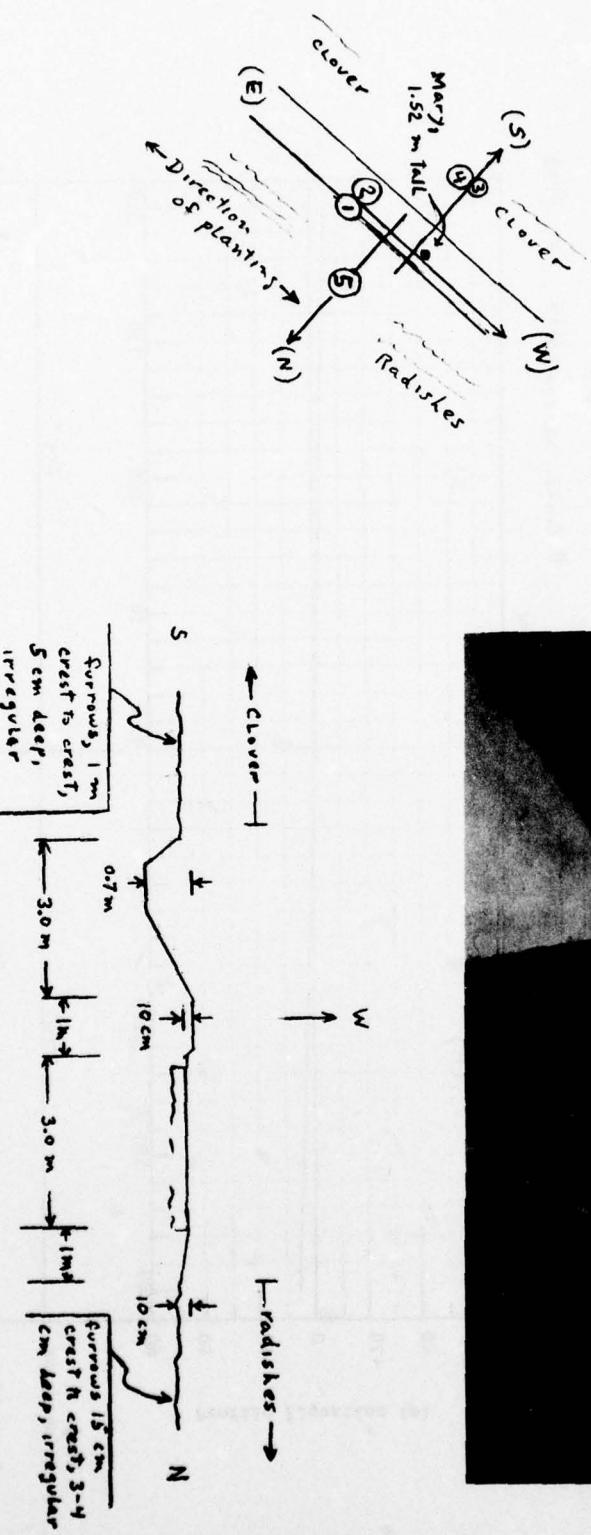
Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

* field observation, Aug 1973

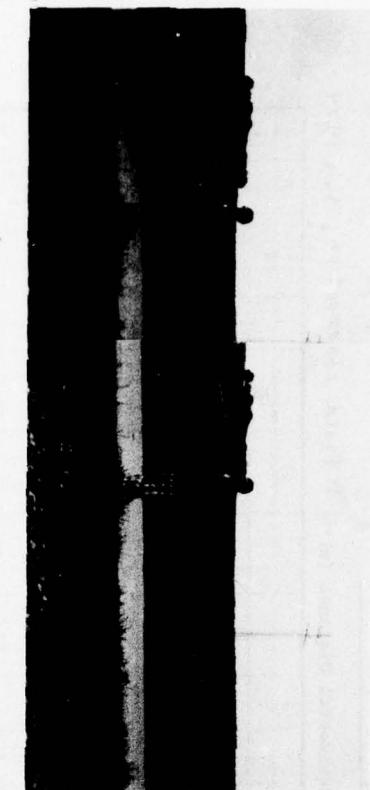


SITE 74 - PROFILE DATA

A109



SITE 74 (Sheet 1 of 2)



4

3

SITE 74 (Sheet 2 of 2)

ALL



5

Sample Number: 75

Date: _____

Notes and Comments:

MAP NUMBER: 5621
SCALE: 1:25000

Scale: 1:5000

2

Coordinate Location: Geographic: $50^{\circ}21'02''N$ $09^{\circ}15'03''E$

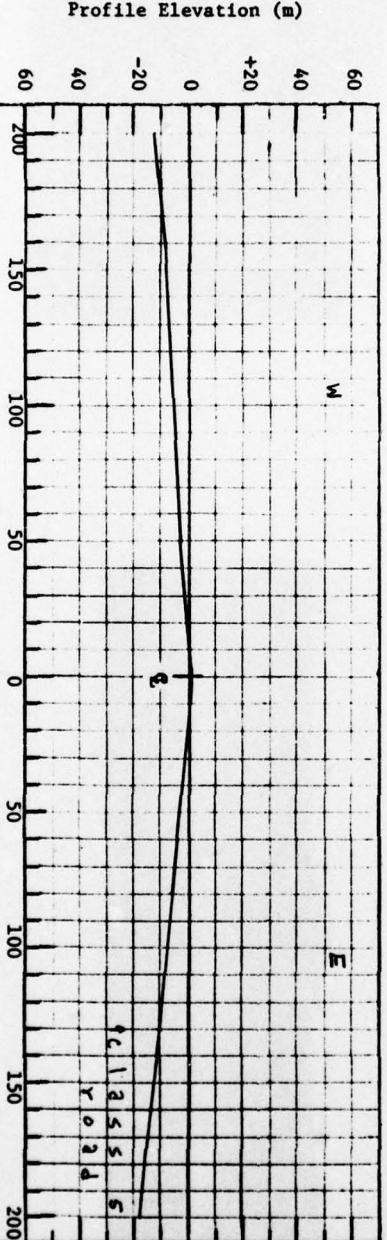
Geographic: $50^{\circ}21'02''N$ UTM Ref.:
h.// $09^{\circ}15'03''E$

Road: Class: 5 Direction: N

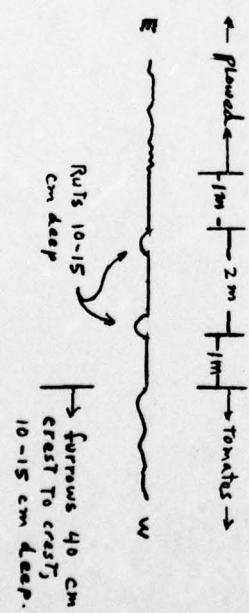
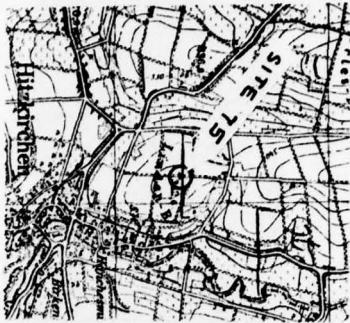
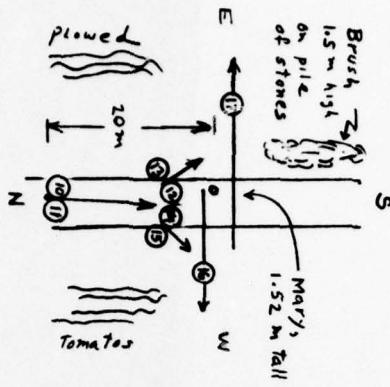
Site Type: 2

Construction:		Traffic Surface	Shoulder	
Width (m)	Material	Thick (cm)	Width (m)	Material
*	Surface	Soil		
2	Base			
	Subbase			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation	135°	135°
Vegetation	2XX (* tomatoes)	(* plowed) 2XX
Soil	ML-6 (* clay loam)	(* clay loam) ML-6
Microrelief		



SITE 75 (Sheet 1 of 2)

SITE 75 (Sheet 2 of 2)



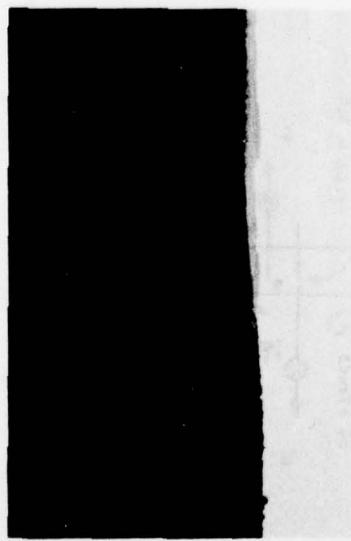
14

15

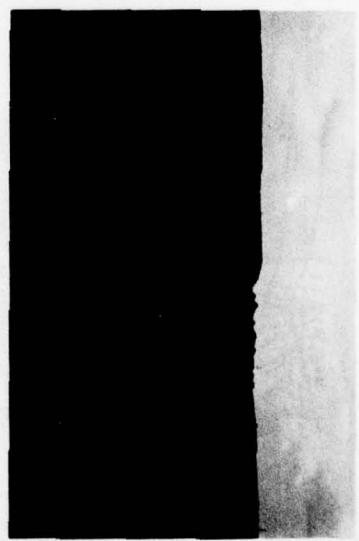


13

12



16



17

A114

Sample Number: 76

Date: 9 Sept 74

Notes and Comments:

Map Number: 5621 Scale: 1:25000

Coordinate Location: Geographic: $50^{\circ}21'23''N$ UTM Ref.: $09^{\circ}15'22''E$

Landscape: *Cultivated hillside* *4 w/pasture valley floor*

Road: Class: 3 Direction: N Site Type: 4

Sources:

Map 1964
(1957 date)

Aerial photos 19—
* field observations

Aug 1974
ground photos Aug 1974.

Construction:

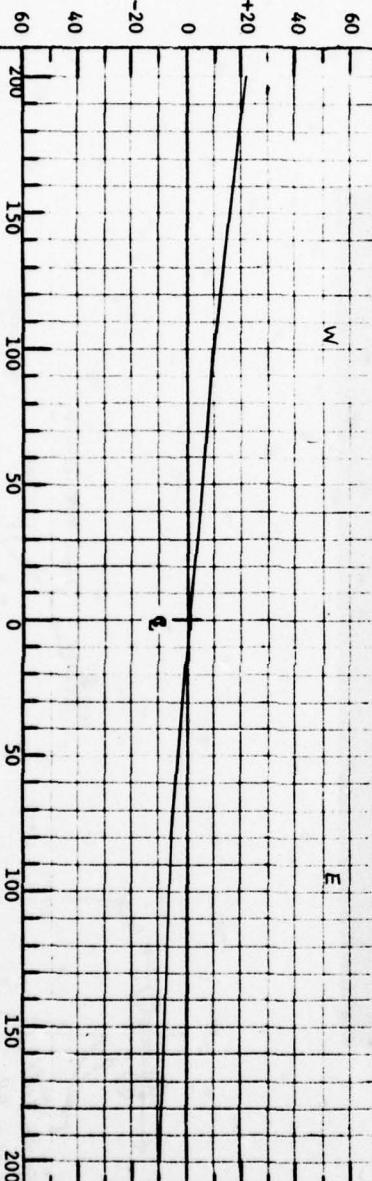
Width (m)	Traffic Surface		Shoulder	
	Material	Thick (cm)	Width (m)	Material
* 5.5	* Blacktop			
	Base			
	Subbase			

Horizontal Distance (m)

W

E

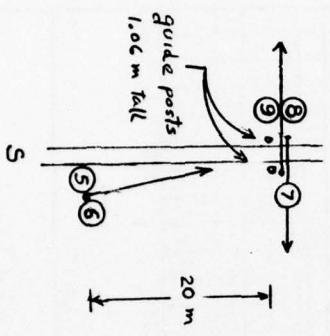
Profile Elevation (m)



Slope Orientation
Vegetation
Soil
Microrelief

Slope Orientation	0°
Vegetation	2XX
Soil	M-L-6 (* silt loam) (silt loam) 0L-4
Microrelief	

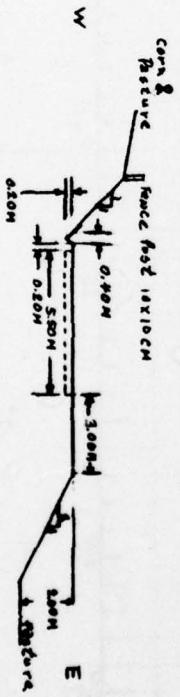




5



6



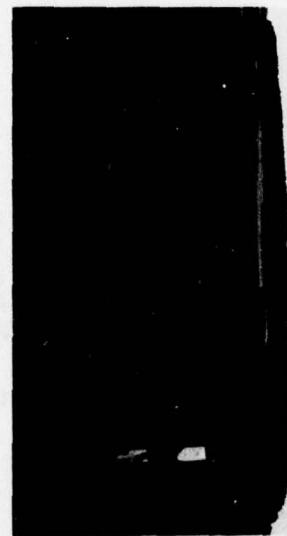
SITE 76 (Sheet 1 of 2)

A116



SITE 76 (Sheet 2 of 2)

ATT



Sample Number: 77

Date: 9 Sept 74

Map Number: 5621

Scale: 1:250000

Coordinate Location:

Geographic: 50°22'05"N UTM Ref.: 09°16'49"E

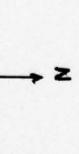
Landscape: Flooded upland

Road: Class: 4

Direction: N

Site Type: 2

Notes and Comments:



Construction:

Width (m)	Traffic Surface		Shoulder	
	Material	Thick. (cm)	Width	Material
* 2.5	Metallic			

Horizontal Distance (m)

* From field observation, Aug 1974



Slope Orientation

90° 150° 150°

Vegetation

335

454

Soil

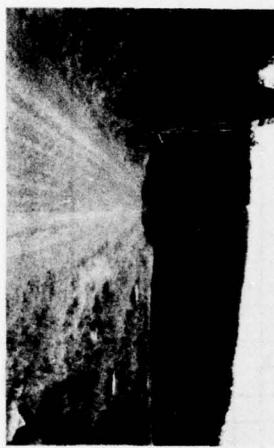
ML-11

ML-11

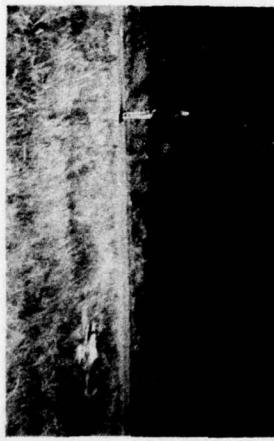
Microrelief



3



4

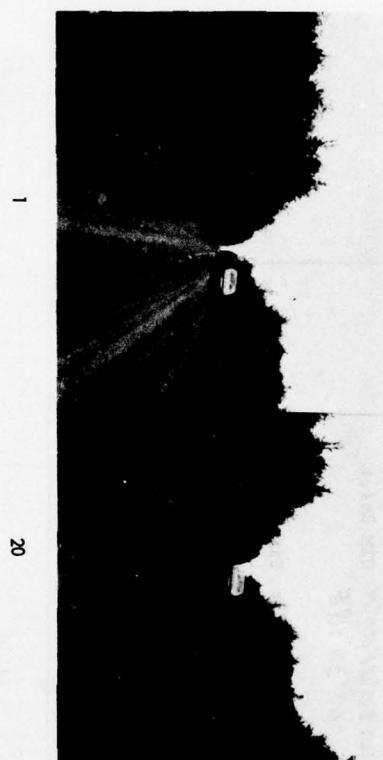
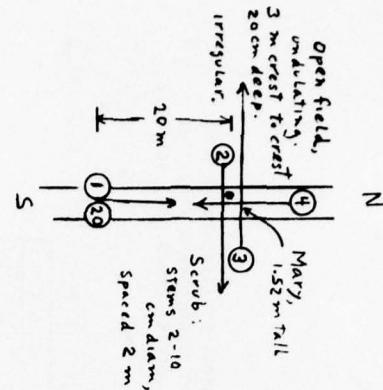


2



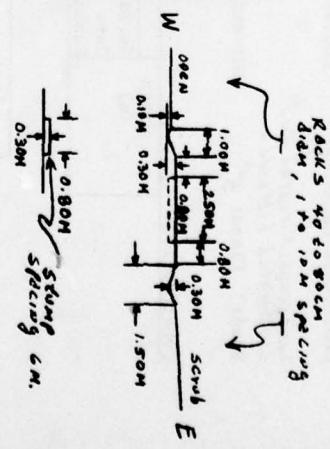
SITE 77

A119



1

20



Notes and Comments:

Sample Number: 78

Date: 9 Sept 74

Map Number: 5623

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}21'20''N$ UTM Ref.:
 $09^{\circ}35'18'E$ Landscape: *Forested and
Cultivated hillside*

Road: Class: 5

Direction: NE Site Type: 2

Construction:

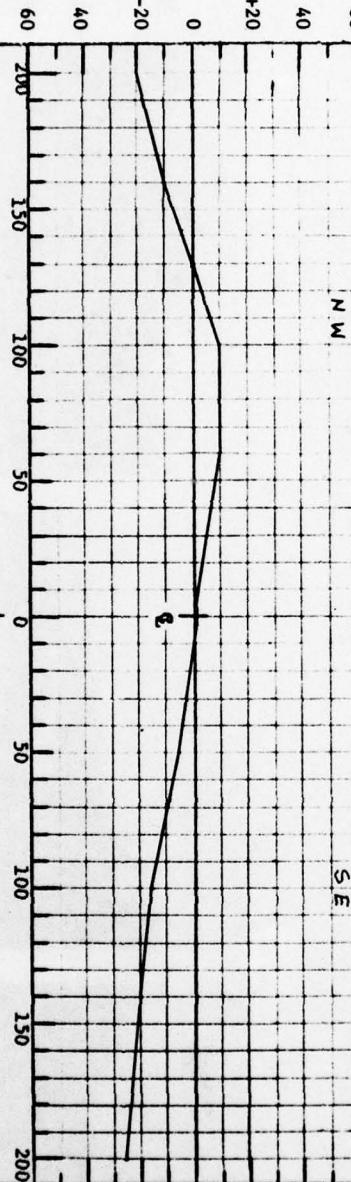
Width (m)	Traffic Surface			Width (m)	Material
	Material	Thick (cm)	Shoulder		
Surface			Base		Subbase

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Profile Elevation (m)



Slope Orientation

 160° 180° 180°

Vegetation

445

XXX

Soil

CL-21

CL-7

Microrelief

Sample Number: 79

Date: 9 Sept 74

Map Number: 5623

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}21'00''N$ UTM Ref.:

Landscape: *Forested upland*

$04^{\circ}39'21''E$

Road: Class: 4

Direction: NW

Site Type: /

Notes and Comments:



Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Surface	Base	Subbase		
60					

Horizontal Distance (m)

60

40

+20

0

-20

40

60

200

150

100

50

0

50

100

150

200

S.W.

N.E.

S.W.

N.E.

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Profile Elevation (m)

Slope Orientation
 150° 80°

Vegetation

655

655

Soil

ML-11

ML-11

Microrelief

Sample Number: 80

Date: 9 Sept 74

Notes and Comments:

Map Number: 5625

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}21'24''N$ UTM Ref.:
 $09^{\circ}55'00''E$

Landscape: ~~Ridge and~~
foreside hill side

Road: Class: 5

Direction: NW Site Type: 5

Construction:

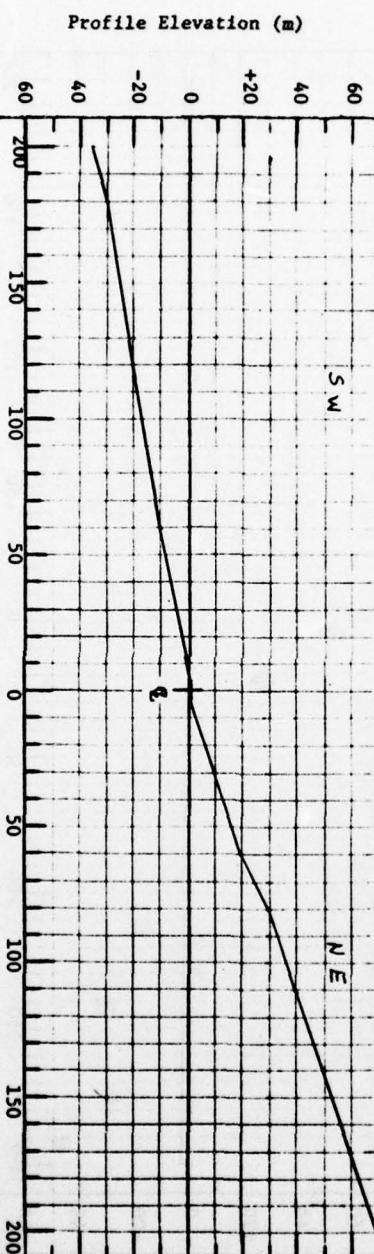
Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Material	Thick (cm)	Width (m)		
	Surface				
	Base				
	Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)

S W

N E



Slope Orientation

180° 30°

Vegetation

2 XX

Soil

5C-1

Microrelief

Sample Number: 81

Date: 9 Sept 74

Notes and Comments:

Map Number: 5625 Scale: 1: 25000

Coordinate Location:

Geographic: 50°22'34"N UTM Ref.:

Landscape: pasture

part of cut bank side

Road: Class: 3

Direction: NE

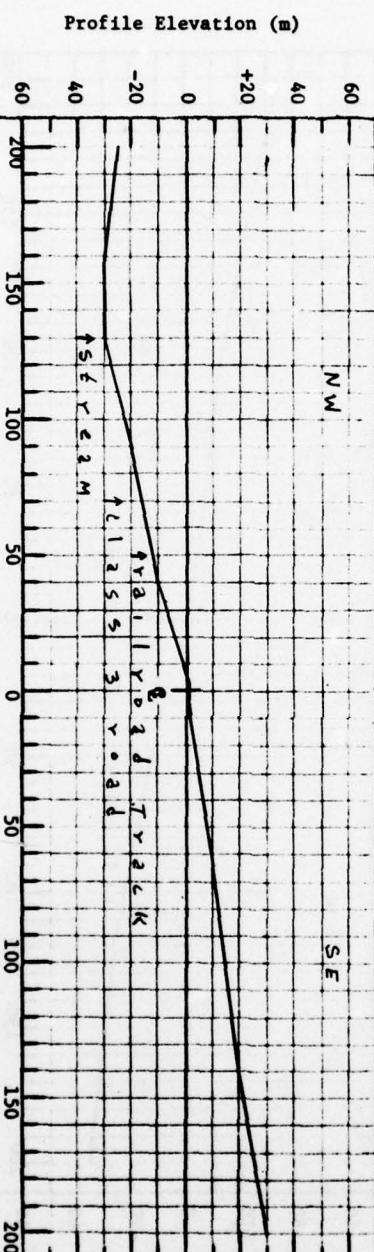
Site Type: 3/4

Construction:

Width (m)	Traffic Surface			Shoulder	
	Surface	Material	Thick (cm)	Width (m)	Material
Subbase					

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation	135°	45°
Vegetation	2XX	2XX
Soil	SC-1	SC-1
Microrelief		

Notes and Comments:

Sample Number: 82

Date: 9 Sept 74

Map Number: 5425

Scale: 1:25000

Coordinate Location:

Geographic: $50^{\circ}22'3''N$ UTM Ref.:
 $09^{\circ}55'40''E$

Landscape: Forested hillside

Road: Class: 4

Direction: NW

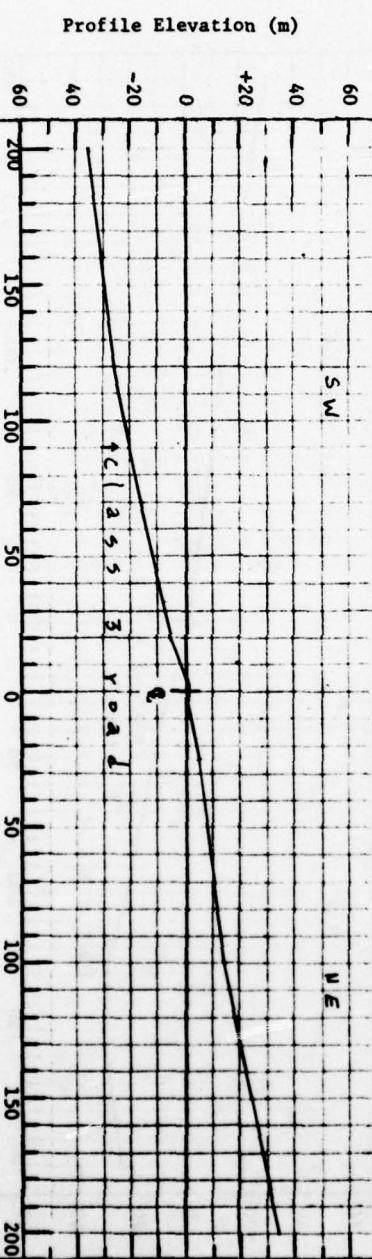
Site Type: 4

Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Surface	Material	Thick (cm)		
Base				Subbase	

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Profile Elevation (m) Horizontal Distance (m)



Slope Orientation	135°
Vegetation	6XX
Soil	SC-12
Microrelief	

Sample Number: 83

Date: 9 Sept 74

Notes and Comments:

Map Number: L 591C Scale: 1:500 00

Coordinate Location: Geographic: 50° 09' 18" N UTM Ref.: 08° 35' 00" E

Landscape: Cultivated plain

Road:

Class: 4

Direction: NE

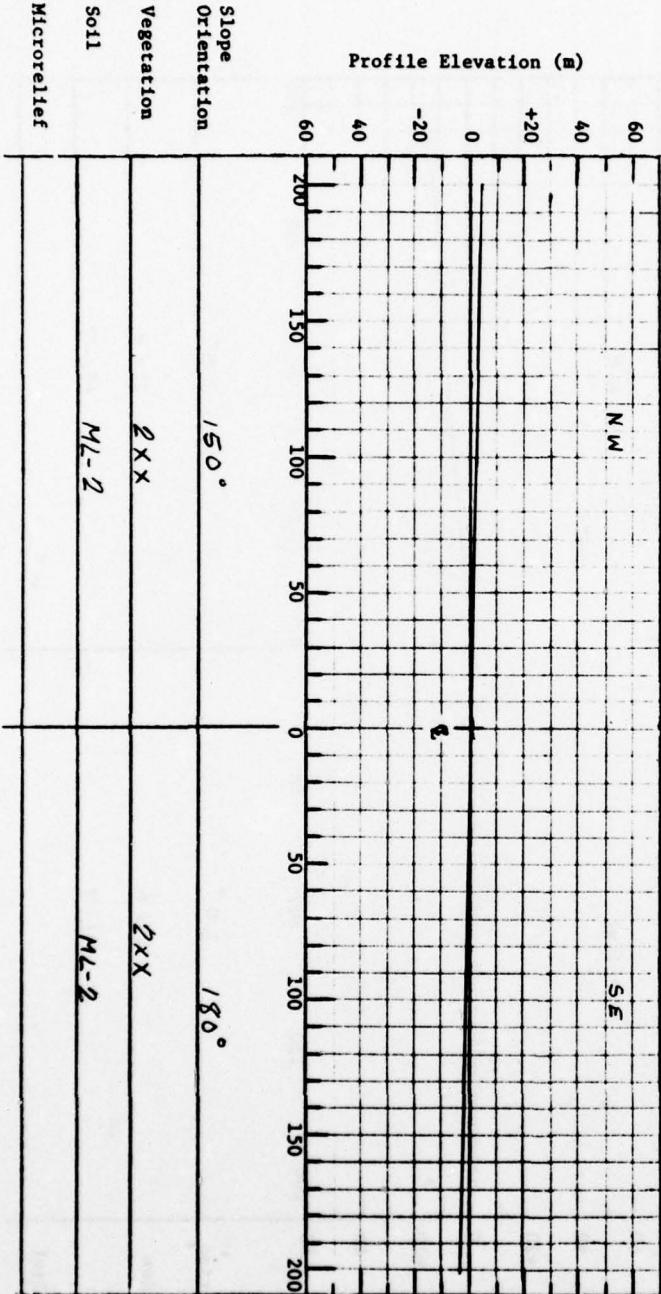
Site Type: 1

Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Surface	Material	Thick (cm)		
Base				Subbase	

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation

150°

180°

Vegetation

2XX

2XX

Soil

ML-2

ML-2

Microrelief

Sample Number: 84

Date: 9 Sept 74

Notes and Comments:

Map Number: L59/L

Scale: 1:50000

Coordinate Location:

Geographic: 50°09'34"N UTM Ref.:
08°35'10"E
Landscape: *Cultivated*
Soil

Road: Class: 5 Direction: NW Site Type: 1/4

Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Surface	Material	Thick (cm)		
Subbase					

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)



NW

NE

Slope Orientation: 60° 30°

Slope Orientation	60°	30°
Vegetation	2XX	2XX
Soil	ML-7	ML-7
Microrelief		

Sample Number: 85

Date: 9 Sept 74

Notes and Comments:

Map Number: L 59/4

Scale: 1:50000

Coordinate Location:

Geographic: 50°10'18"N UTM Ref.:

09°35'00"E

Landscape: Orchard and
Cultivated valley floor

Road: Class: 3

Direction: N-E

Site Type: /

Construction:

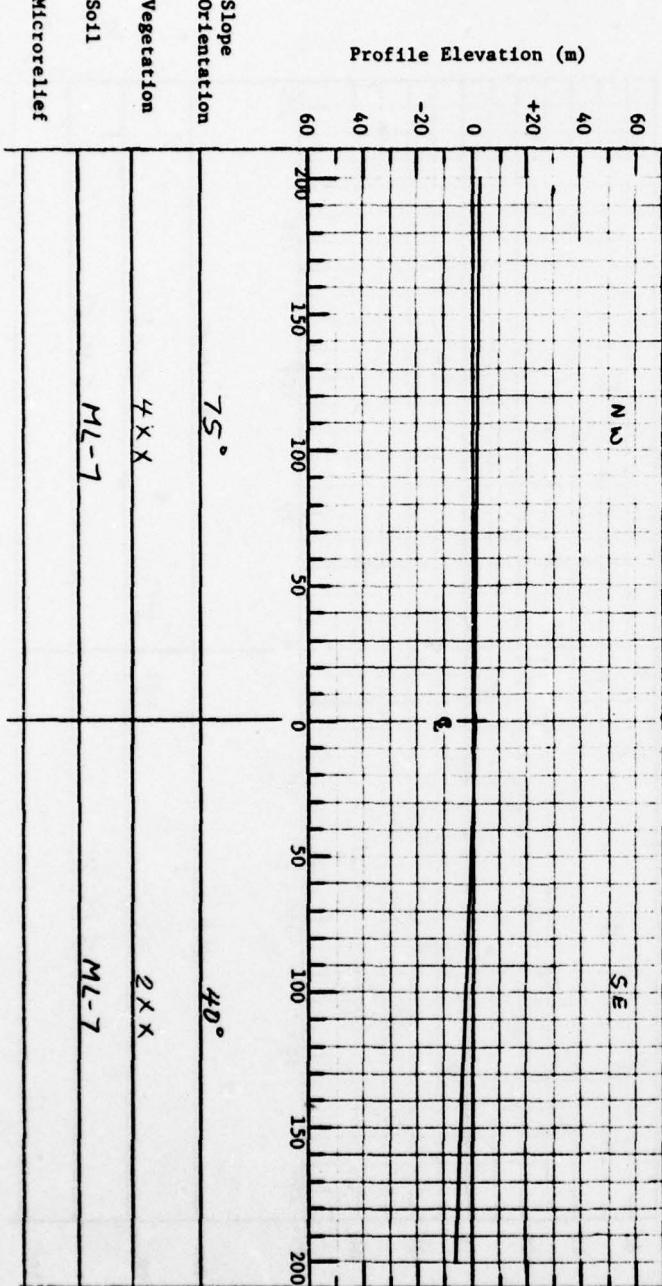
Width (m)	Traffic Surface		Shoulder Material	Width (m)	Material
	Surface	Base			
Subbase					

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Profile Elevation (m)



Slope Orientation

75° 40°

Vegetation

4XX 2XX

Soil

ML-7 ML-7

Microrelief

Sample Number: 86

Date: 10 Sept 74

Notes and Comments:

Map Number: L-5918

Scale: 1:50000

Coordinate Location:

Geographic: 50°09'14"N 08°55'23"E

UTM Ref.:

Landscape: Pasture

Valley floor

Road: Class: 2

Direction: E

Site Type: 1

Construction:

Width (m)	Traffic Surface		Shoulder Material
	Material	Thick (cm)	
Surface			
Base			
Subbase			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)

60
40
20
0
-20
-40
-60

N

S



Slope Orientation

NA

NA

Vegetation

XXX

XXX

XXX

Soil

SM-2

SM-2

SM-2

Microrelief

Sample Number: 87

Date: 10 Sept 74

Notes and Comments:

Map Number: L 59/8

Scale: 1:50000

Coordinate Location:

Geographic: 50°09'23"N UTM Ref.:

Landscape: *Forested
Hillside*

Road: Class: 4

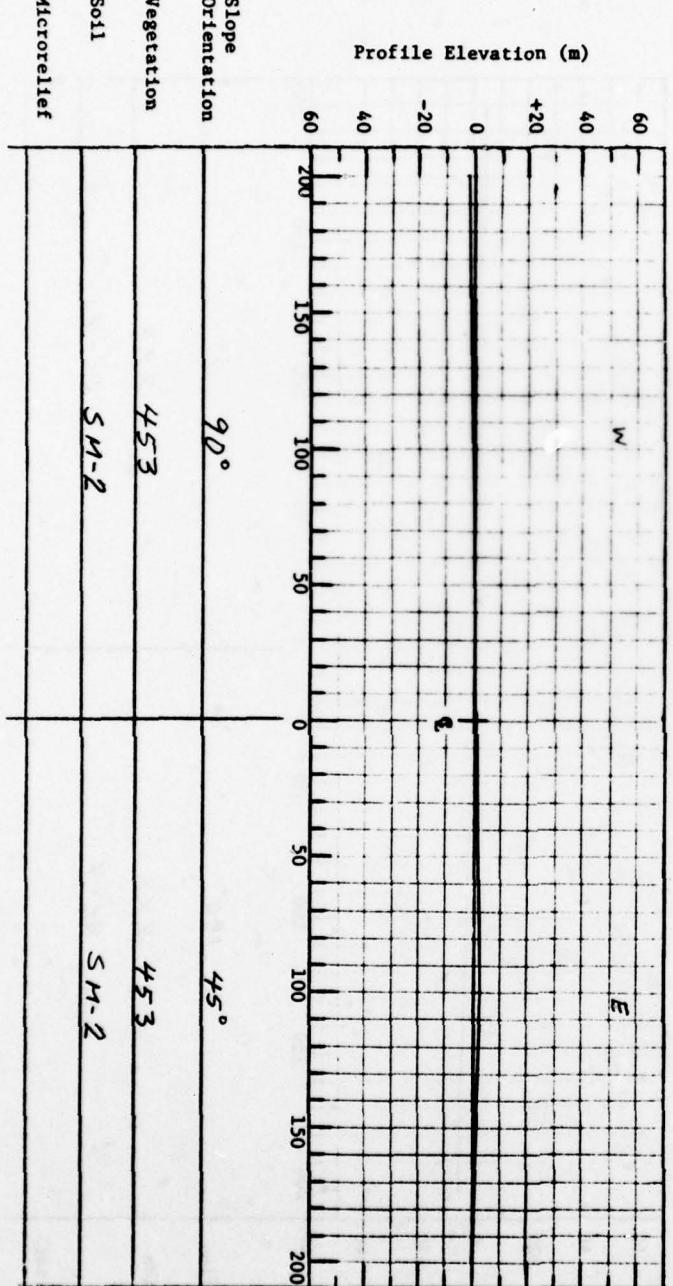
Direction: N

Site Type: 1

Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Surface	Material	Thick (cm)		
Base					
Subbase					

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Sample Number: 88

Date: 10 Sept 74

Notes and Comments:

Map Number: L-54/8 Scale: 1:50000

Coordinate Location:

Geographic: 50°10'40"N UTM Ref.: 08°57'50"E

Landscape: $\frac{1}{1000}/\frac{1}{2}$

Road: Class: 3

Direction: NW

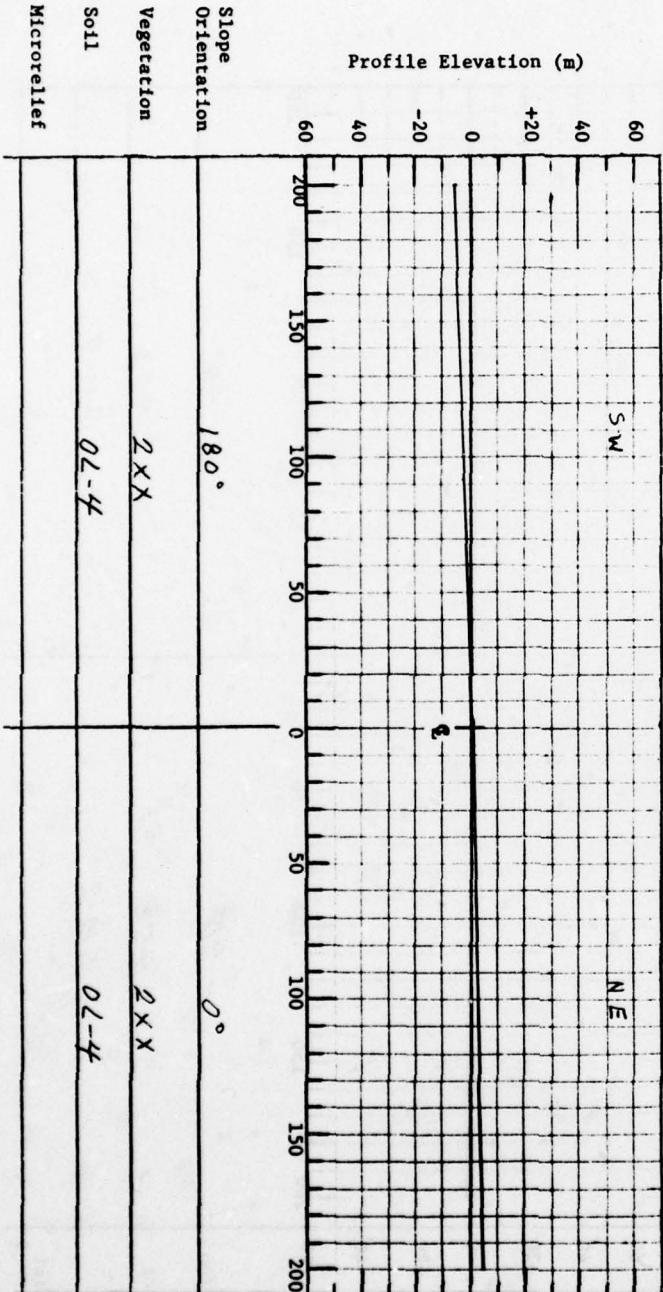
Site Type: 4

Construction:

Width (m)	Traffic Surface		Shoulder Width (m)	Material
	Surface	Material		
Subbase				

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope
Orientation

Vegetation

Soil

Microrelief

Sample Number: 89

Date: 10 Sept 74

Map Number: L5918

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}10'49''N$ UTM Ref.:

$08^{\circ}58'04''E$

Landscape: *Plains*
Cultivated land

Road: Class: 5 Direction: NW Site Type: 1

Notes and Comments:

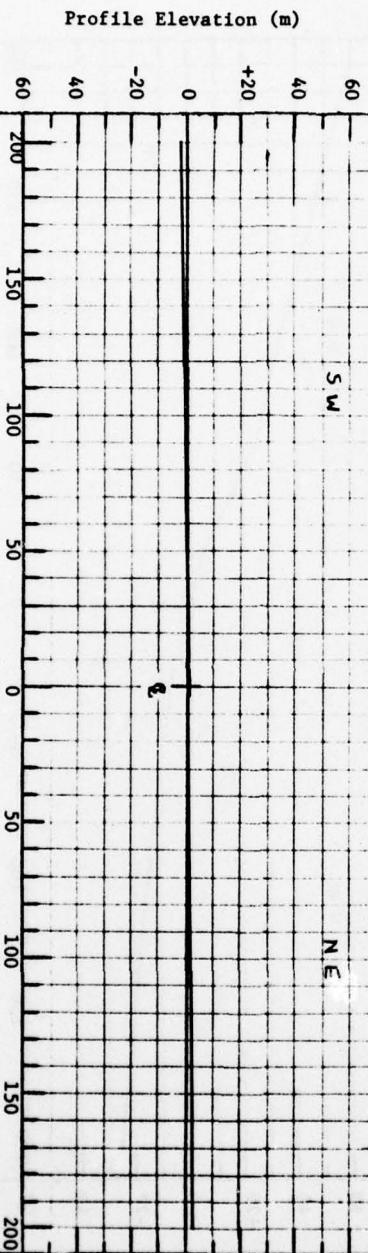


Construction:

Traffic Surface		Shoulder	
Width (m)	Material	Width (m)	Material
Base			
Subbase			

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation	180°	0°
Vegetation	2XX	2XX
Soil	ML-7	ML-7
Microrelief		

Sample Number: 90

Date: 10 Sept 74

Notes and Comments:

Map Number: L 5420

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}4'00''N$ UTM Ref.:

$09^{\circ}15'34''E$

Landscape: Forested
and cultivated hill slope

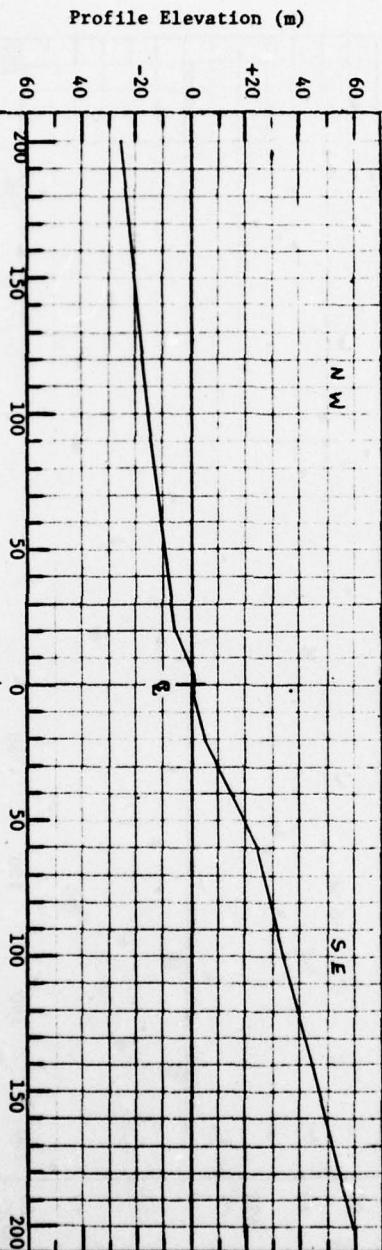
Road: Class: 5 Direction: NE Site Type: 4

Construction:

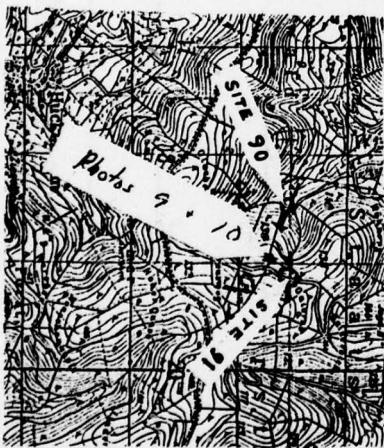
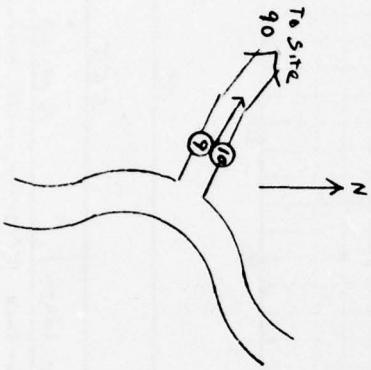
Width (m)	Traffic Surface			Shoulder Material
	Surface	Material	Thick (cm)	
Base			(m)	
Subbase				

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



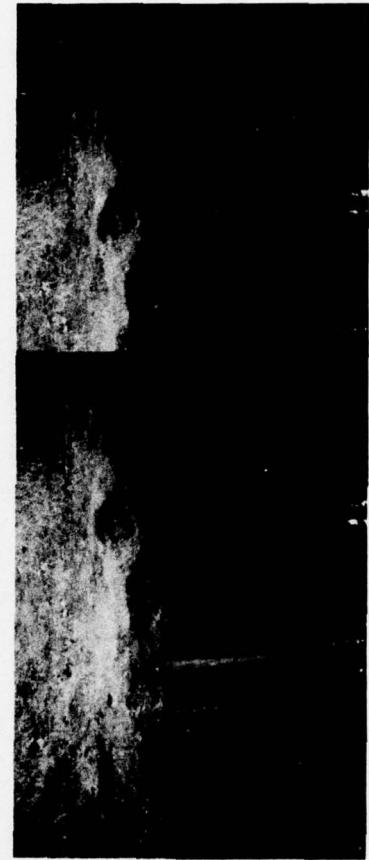
Slope Orientation	180°	0°
Vegetation	454	2XX
Soil		SM-10
Microrelief		



SITE 90
A133

Selected site is inaccessible. Photographs are at $50^{\circ}08'55''N$, $09^{\circ}15'55''E$ (UTMG coordinates 189 553) on the same road or the same road system, just off the main road from Site 91. (No field profile detail.)

9



10

Sample Number: 91

Date: 10 Sept 74

Notes and Comments:

Map Number: L5920

Scale: 1:50000

Coordinate Location:

Geographic: 50°09'00"N UTM Ref.:

09°16'03"E

Landscape: Forested hill side

Road: Class: 4

Direction: N

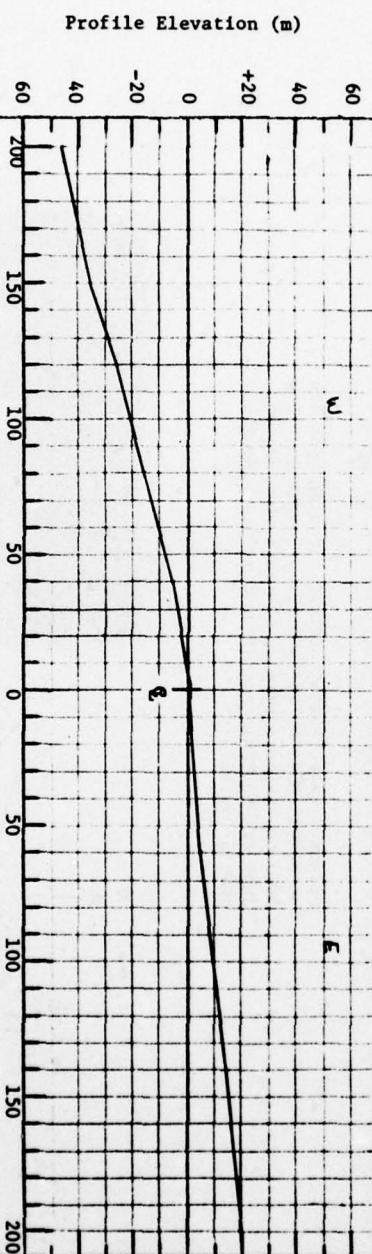
Site Type: 4

Construction:

Width (m)	Traffic Surface Material	Thickness (cm)	Shoulder Width (m)	Shoulder Material
* 2 parallel strips Subbase	Concrete			

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

* field observation Aug 1974



Slope Orientation

180°

0°

Vegetation

555

555

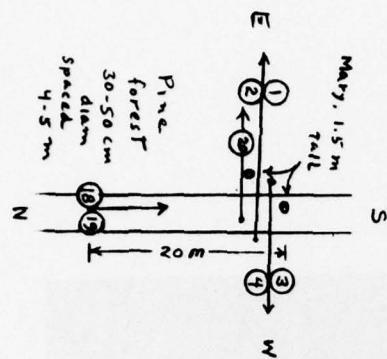
Soil

SM-10 (* stony sandy loam)

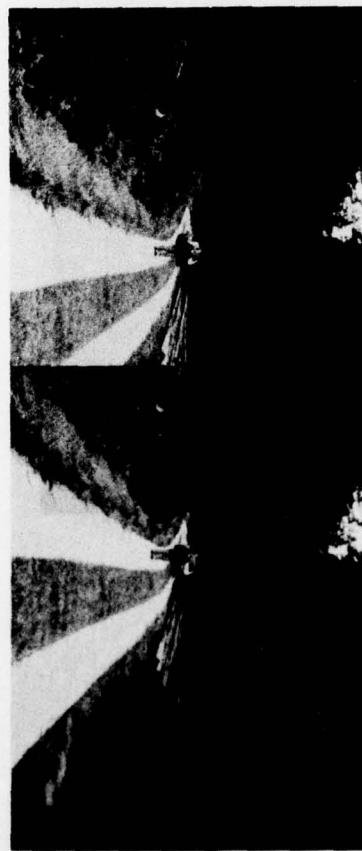
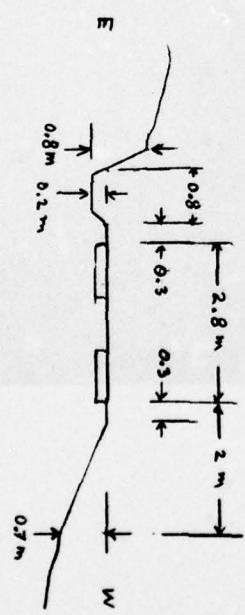
SM-10

Microrelief

* many stones less than 15 cm diam. * surface irregular, with mounds 20 cm high spaced 4 m apart, both sides.



20



18

19

SITE 91 (Sheet 1 of 2)

A135



2

1



3

4

SITE 91 (Sheet 2 of 2)

A136

Notes and Comments:

Sample Number: 92

Date: 10 Sept 74

Map Number: L 5922

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}09'04''N$ UTM Ref.:
 $09^{\circ}35'00''E$

Landscape: Forested valley

Road: Class: 3

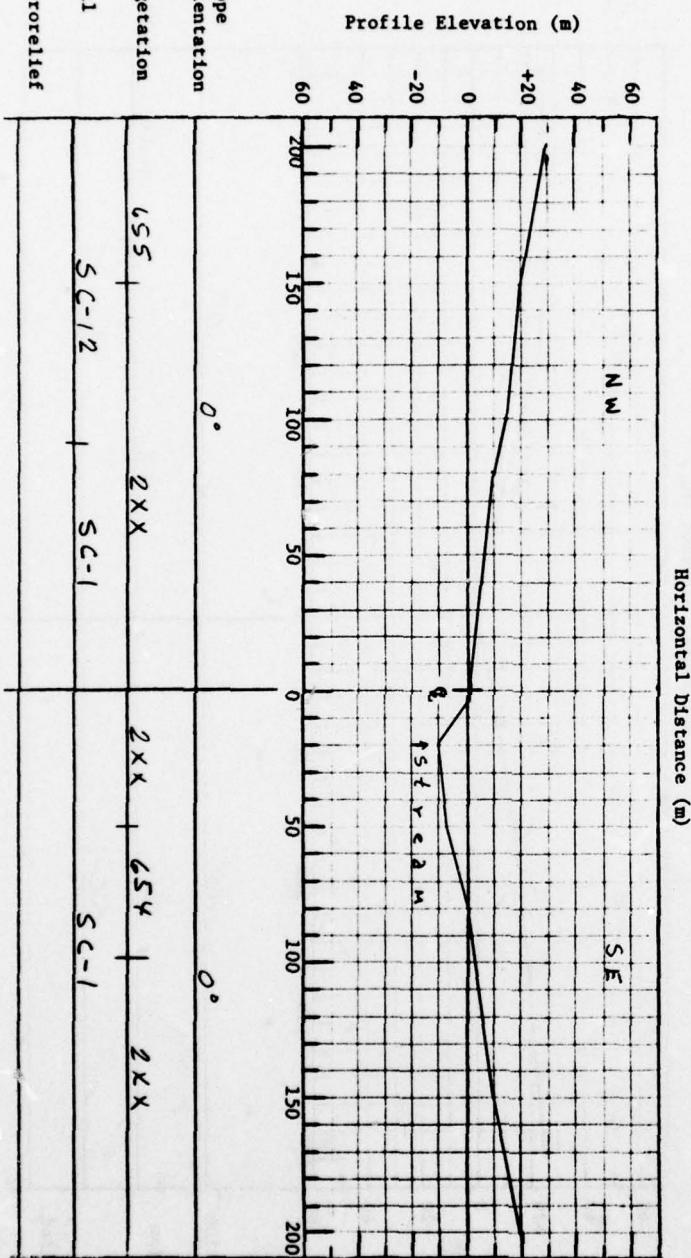
Direction: NE

Site Type: 3

Construction:

Width (m)	Traffic Surface Material	Thick (cm)	Width (m)	Shoulder Material
Surface				
Base				
Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



SITE 92 - PROFILE DATA

A137

Slope Orientation	0°	0°
Vegetation	655	2XX
Soil	SC-12	SC-1
Microrelief		

Sample Number: 93

Date: 10 Sept. 74

Notes and Comments:

Map Number: L 5922

Scale: 1:50000

Date:

Coordinate Location:

Geographic: 50°0'4" N UTM Ref.:

09°35'40"E

Landscape: *Forested
and Eroded valley*

Road: Class: 5

Direction: NW

Site Type: 3

Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Material	Thick (cm)	Material		
	Surface				
	Base				
	Subbase				

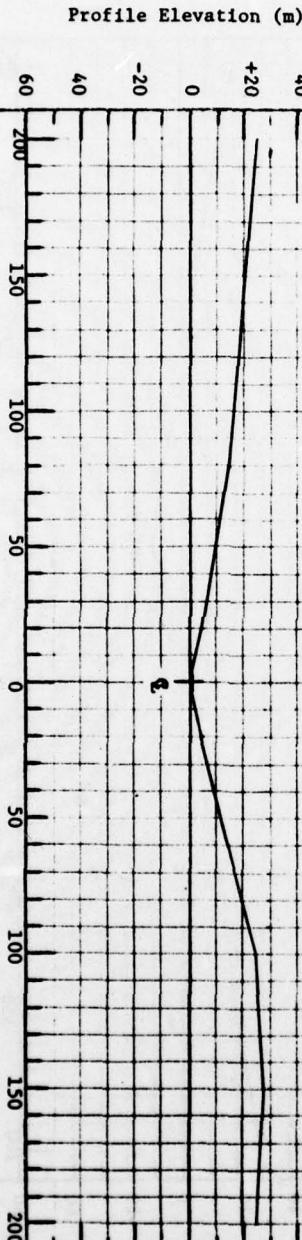
Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)

Profile Elevation (m)

S W

N E



Slope Orientation

180°

Vegetation

2XX

2XX

444

Soil

SC-1

SC-12

Microrelief

Sample Number: 94

Date: 10 Sept 74

Notes and Comments:

Map Number: L5922

Scale: 1:50000

10 Sept 74

Coordinate Location:

Geographic: $50^{\circ}10'4''N$ UTM Ref.:

$09^{\circ}35'00'E$

Landscape: Cultivated
and forested land

Road: Class: 4

Direction: NW

Site Type: 4

Construction:

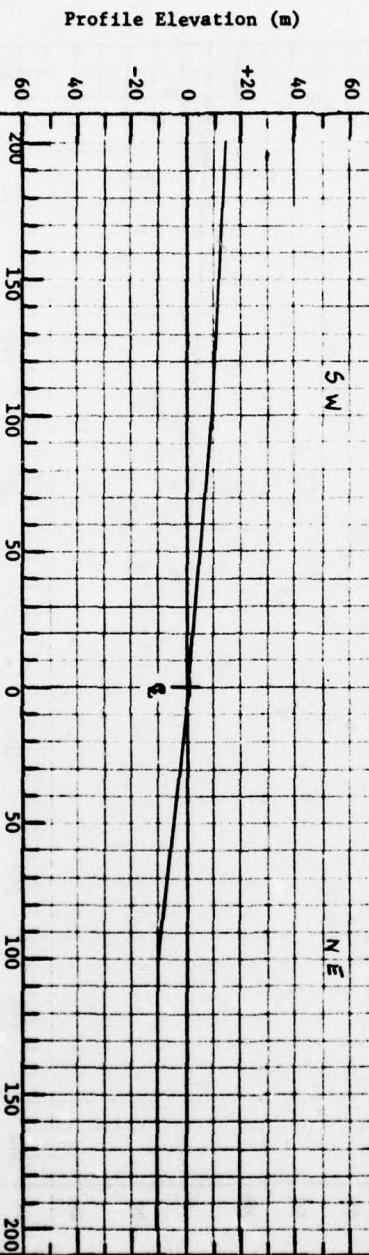
Width (m)	Traffic Surface			Width (m)	Material
	Surface	Material	Thick (cm)		
Base					
Subbase					

Horizontal Distance (m)

S W

N E

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope
Orientation

45°

Vegetation

2XX

444

2XX

Soil

SC-1

SC-1

Microrelief

Notes and Comments:

Sample Number: 95

Date: 10 Sept 74

Map Number: L 5924 Scale: 1:50000

Coordinate Location:

Geographic: 50°0'4" N UTM Ref.:
09°55'22"E

Landscape: Cultivated
and forested hills

Road: Class: 5

Direction: NW

Site Type: 1/4

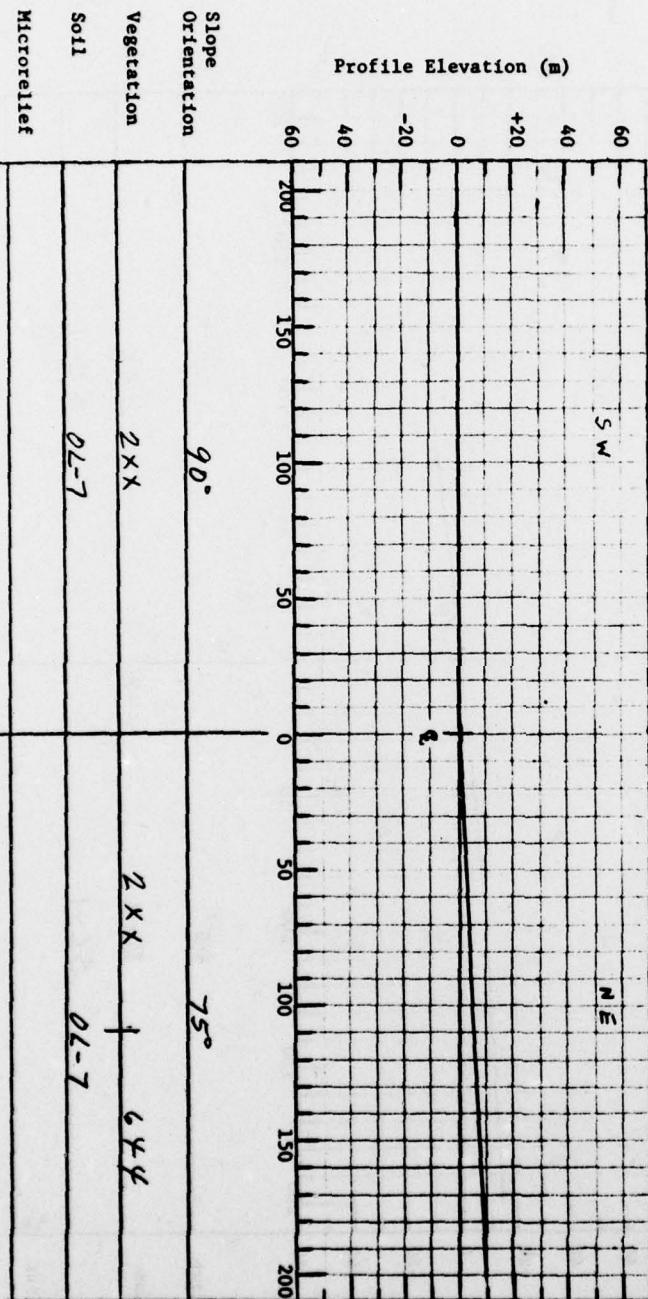
Construction:

Width (m)	Traffic	Surface	Shoulder Material
	Material	Thick (cm)	
Base			
Subbase			

Horizontal Distance (m)



Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



SITE 95 - PROFILE DATA

Sample Number: 96

Date: 10 Sept 74

Map Number: L 5924 Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}10'23''N$ UTM Ref.:
 $09^{\circ}57'22''E$

Landscape: Forested upland

Road: Class: 4

Direction: NW Site Type: 4

Notes and Comments:

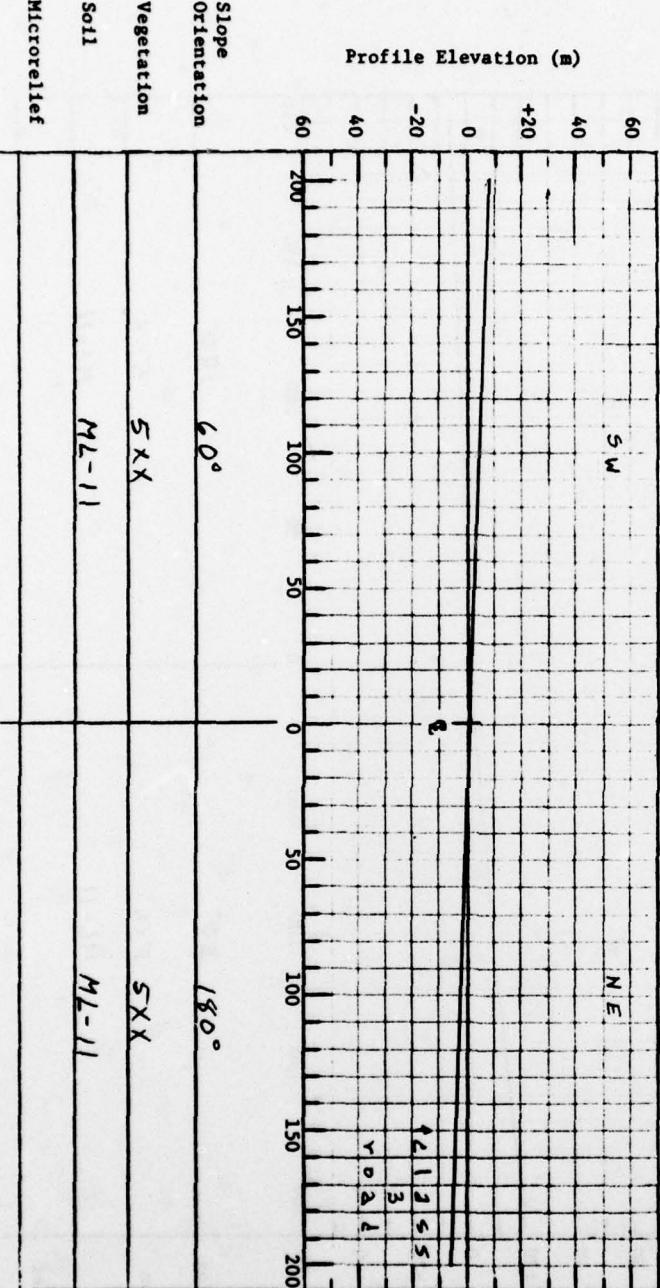


Construction:

Width (m)	Traffic Surface			Shoulder Width (m)	Material
	Surface	Base	Subbase		

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Sample Number: 97

Date: 10 Sept 74

Notes and Comments:

Map Number: L 5924 Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}10'36''N$ UTM Ref.:
 $09^{\circ}57'25''E$

Landscape: Forested upland

Road: Class: 3 Direction: N Site Type: 4

Construction:

Width (m)	Traffic Surface			Shoulder Material
	Surface	Thick (cm)	Width (m)	
Base				
Subbase				

Horizontal Distance (m)

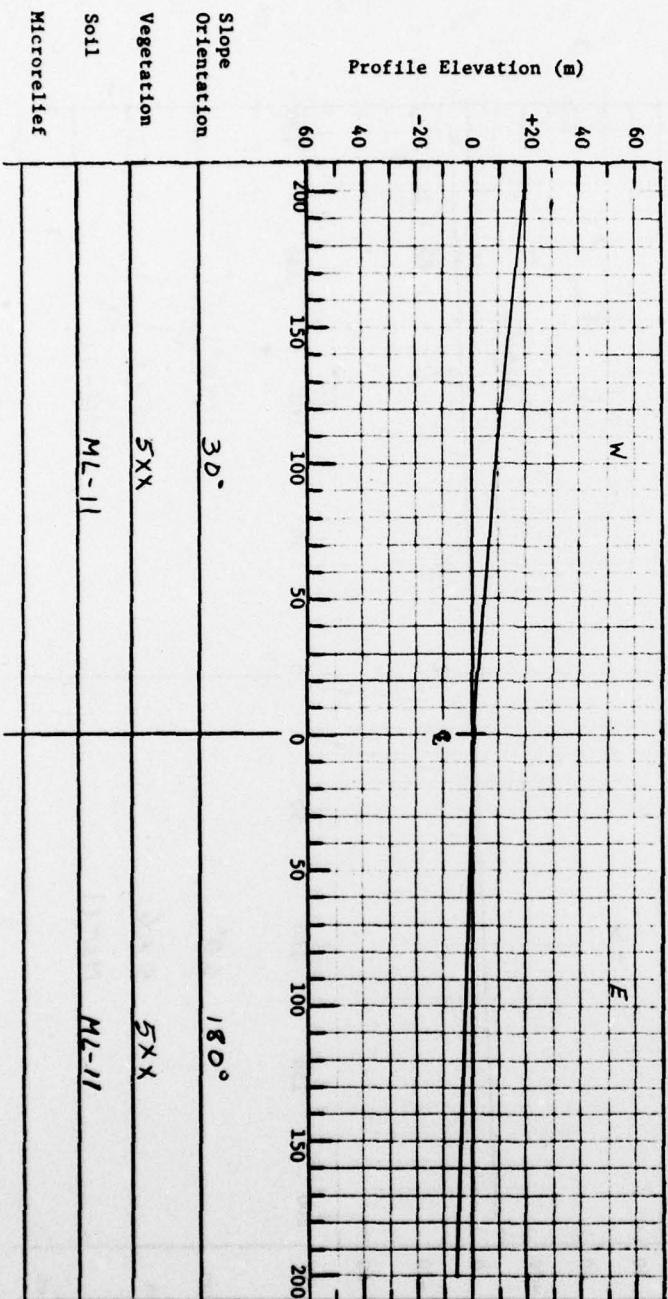
60
40
20
0

-20
-40
-60

W

E

Instruction: On transect profile sketch show location of important features such as stream crossings, ditches, etc.



Digitized by srujanika@gmail.com

Date: 10 Sept 74

Notes and Comments:

Map Number: L5924

Scale: 1:50000

卷之三

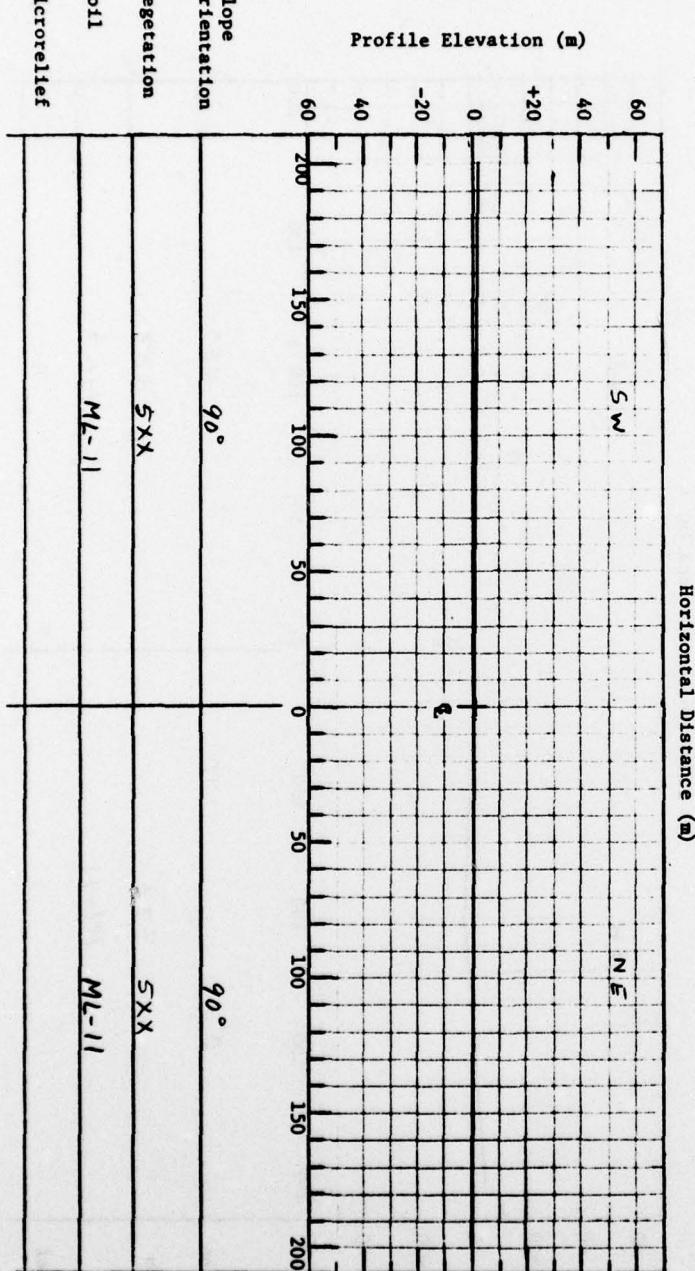
Coordinate Location: Geographic: 30°10'34"N 09°57'46"E

卷之三

Road: Class: / Direction: NW Site Type: /

Construction:	Traffic Surface			Shoulder Material
	Width (m)	Material	Thick (cm)	
Surface				
Base				
Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



SITE 98 - PROFILE DATA

AL43

Sample Number: 99

Date: 10 Sept 74

Notes and Comments:

Map Number: L 5924

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}10'17''N$ $09^{\circ}58'50''E$

Landscape: Shrub-covered

Up/2nd

Road: Class: 2

Direction: NW

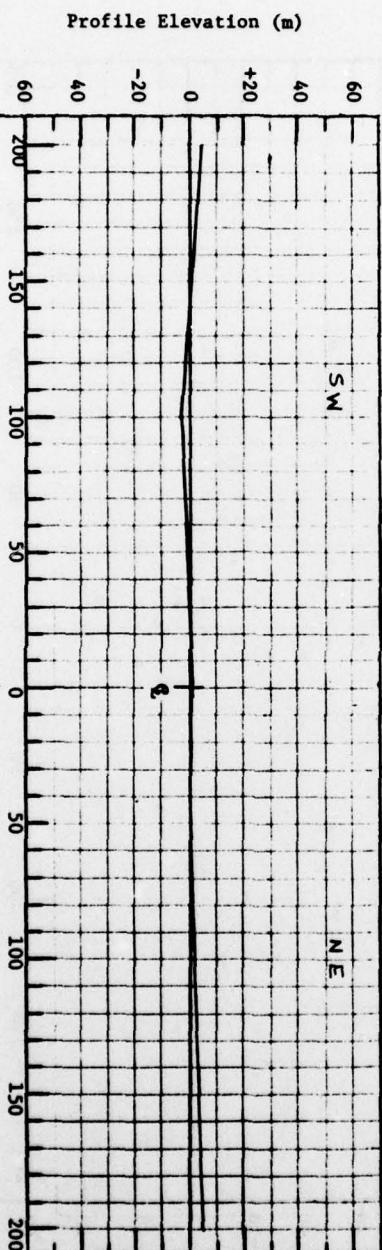
Site Type: 3/4

Construction:

Width (m)	Traffic Surface Material	Thick (cm)	Width (m)	Shoulder Material

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation

0°

180°

45°

Vegetation

333

333

Soil

ML-11

ML-3

Microrelief

Sample Number: 100

Date: 10 Sept 74

Notes and Comments:

Map Number: L 6118

Scale: 1:50000

50000

Coordinate Location:

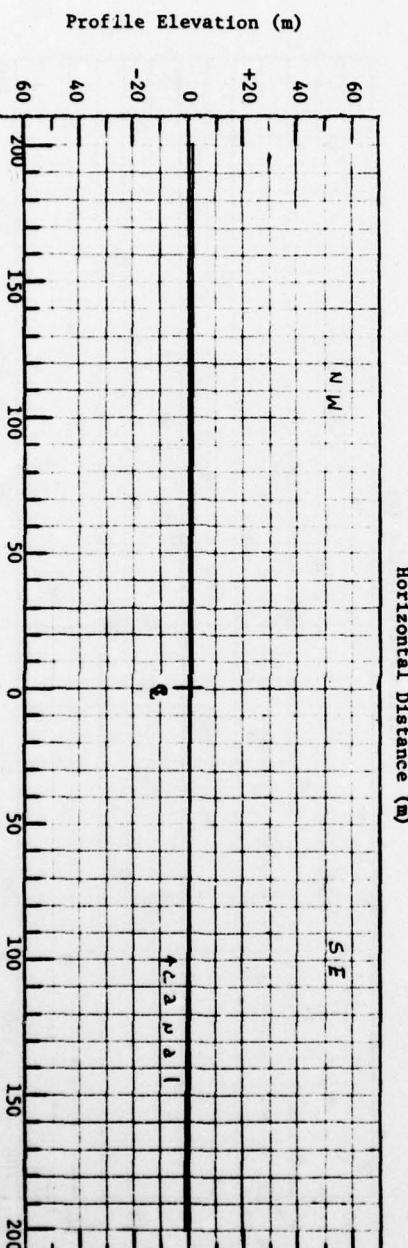
Geographic: 30°-31° N UTM Ref.: 28°-29° E

Road: Class: 5
Landscape: Cut & steep
and forested valley floor

Direction: NE Site Type: /

Construction:	Traffic Surface			Shoulder Material
	Width (m)	Material	Thick (cm)	
Surface				
Base				
Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation	0°	180°
Vegetation	2XX	445
Soil	SM-15	SM-15
Microrelief		

Sample Number: 101

Date: 10 Sept 74

Map Number: L 6118

Scale: 1:50000

Coordinate Location:

Geographic: $50^{\circ}59'20''N$ UTM Ref.: $08^{\circ}55'00''E$

Landscape: *Cultivated land*

Road: *Gravel road*

Class: 2

Direction: NW

Site Type: 1

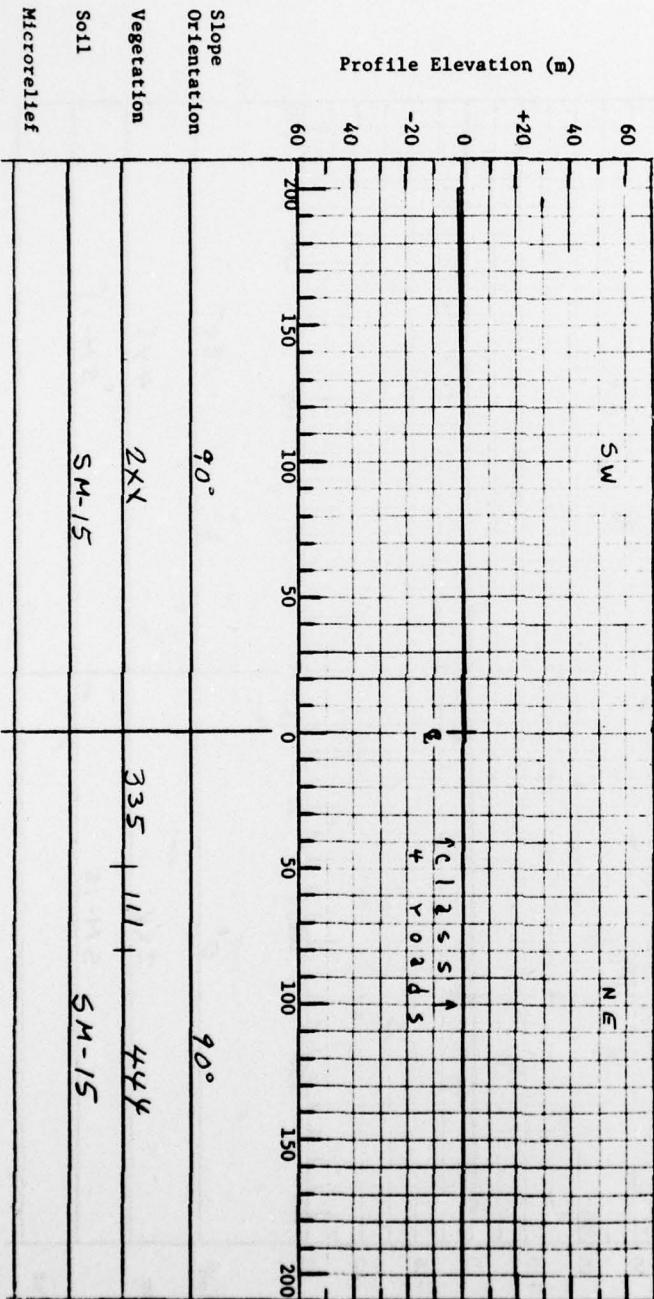
Notes and Comments:



Construction:		Traffic Surface			Shoulder	
Width (m)	Material	Thick (cm)	Width (m)	Material		
Surface						
Base						
Subbase						

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Sample Number: 102

Map Number: L6118 Scale: 1:50000

Date: 10 Sept 74

Notes and Comments:

Coordinate Location:

Geographic: $50^{\circ}59'40''N$ UTM Ref.: $09^{\circ}55'00''E$

Landscape: Shrub-covered
lowland

Road: Class: 4

Direction: NW

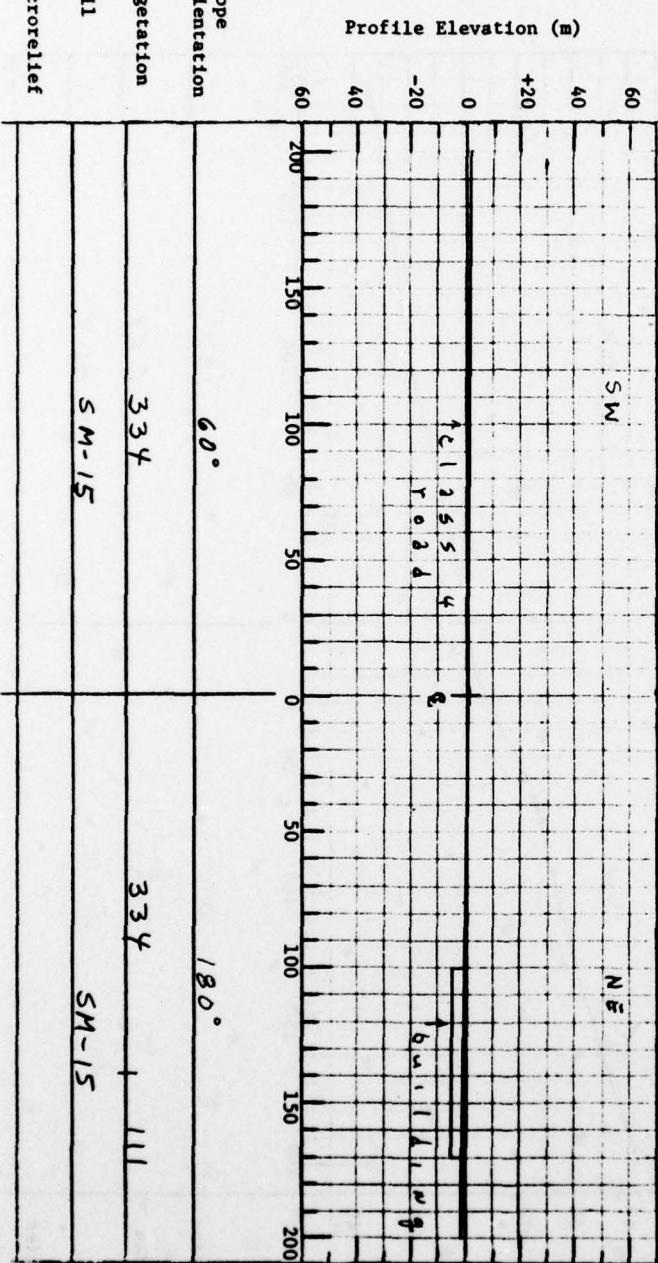
Site Type: 1

Construction:

Width (m)	Traffic Surface			Shoulder	
	Material	Thick (cm)	Width (m)	Material	
Surface			Base		
Subbase					

Horizontal Distance (m)

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



SITE 102 - PROFILE DATA

A117

Sample Number: 103

Date: 10 Sept 74

Notes and Comments:

Map Number: L 6120

Scale: 1:50000

Coordinate Location:

Geographic: $49^{\circ}57'38''N$ $1603'E$

Landscape: Forested and
cultivated hillside

Road: Class: 5

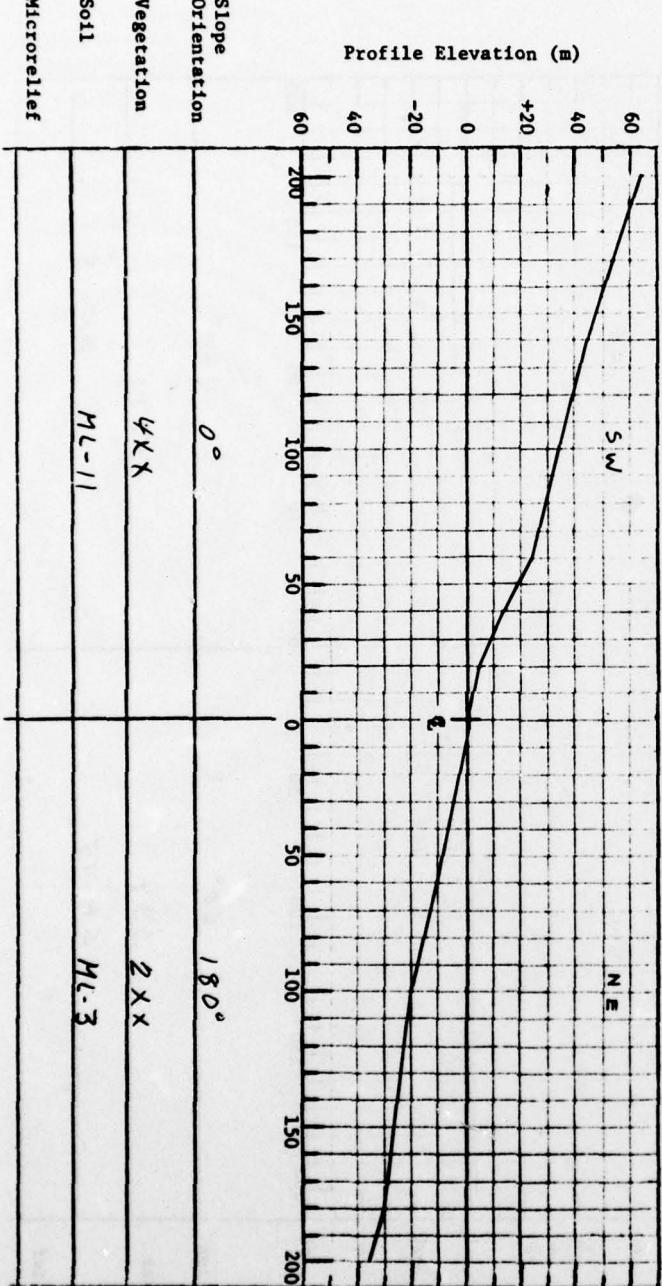
Direction: NW

Site Type: 5

Construction:

Width (m)	Traffic Surface		Shoulder Width (m)	Material
	Material	Thickness (cm)		
Base				
Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.



Slope Orientation

0° 180°

Vegetation

4XX 2XX

Soil

ML-11 ML-3

Microrelief

Sample Number: 104

Date: 10 Sept 74

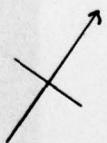
Map Number: L 6120 Scale: 1:50000

Coordinate Location: Geographic: $49^{\circ}58'24''N$ $09^{\circ}17'20''E$

Landscape: Cultivated hillside

Road: Class: I Direction: NW Site Type: 3/4

Notes and Comments:



Construction:

Width (m)	Traffic Surface Material	Thickness (cm)	Shoulder Width (m)	Material
Surface				
Base				
Subbase				

Width (m)	Traffic Surface Material	Thickness (cm)	Shoulder Width (m)	Material
Surface				
Base				
Subbase				

Instruction: On transect profile sketch show location of important features, such as stream crossings, ditches, etc.

Horizontal Distance (m)

60

40

20

0

-20

-40

Profile Elevation (m)

60

40

20

0

-20

-40

-60

-80

-100

-120

-140

-160

-180

-200

-220

-240

-260

-280

-300

-320

-340

-360

-380

-400

-420

-440

-460

-480

-500

-520

-540

-560

-580

-600

-620

-640

-660

-680

-700

-720

-740

-760

-780

-800

-820

-840

-860

-880

-900

-920

-940

-960

-980

-1000

-1020

-1040

-1060

-1080

-1100

-1120

-1140

-1160

-1180

-1200

-1220

-1240

-1260

-1280

-1300

-1320

-1340

-1360

-1380

-1400

-1420

-1440

-1460

-1480

-1500

-1520

-1540

-1560

-1580

-1600

-1620

-1640

-1660

-1680

-1700

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-1740

-1760

-1780

-1800

-1820

-1840

-1860

-1880

-1900

-1920

-1940

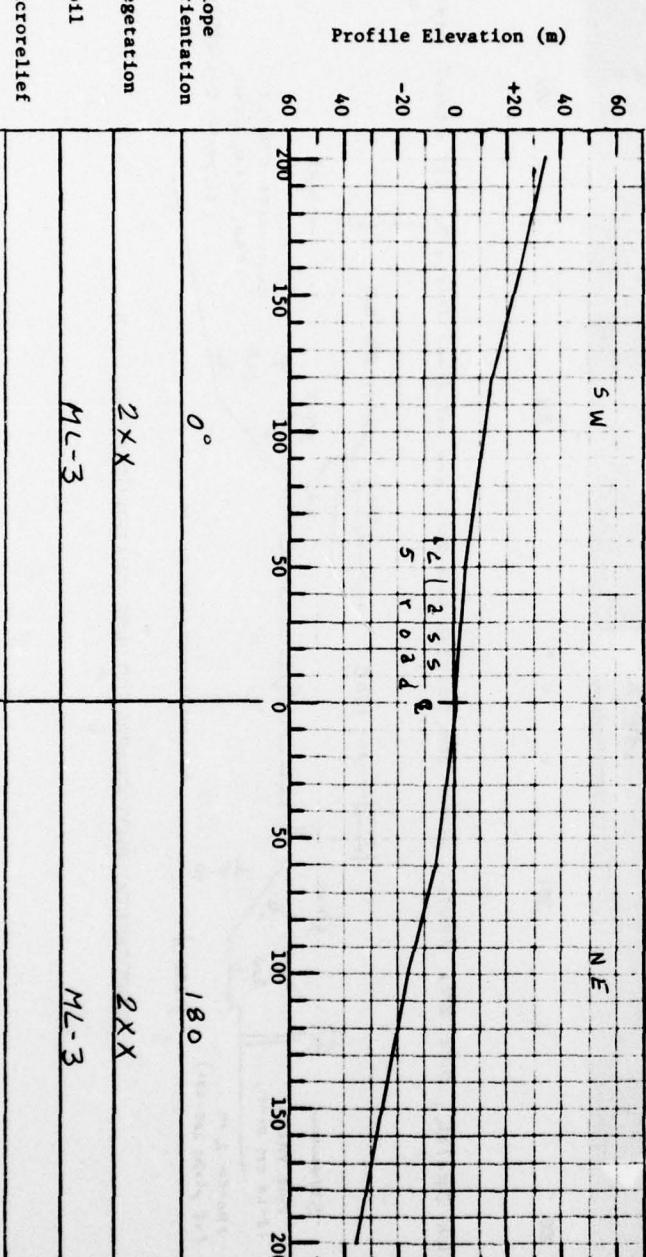
-1960

-1980

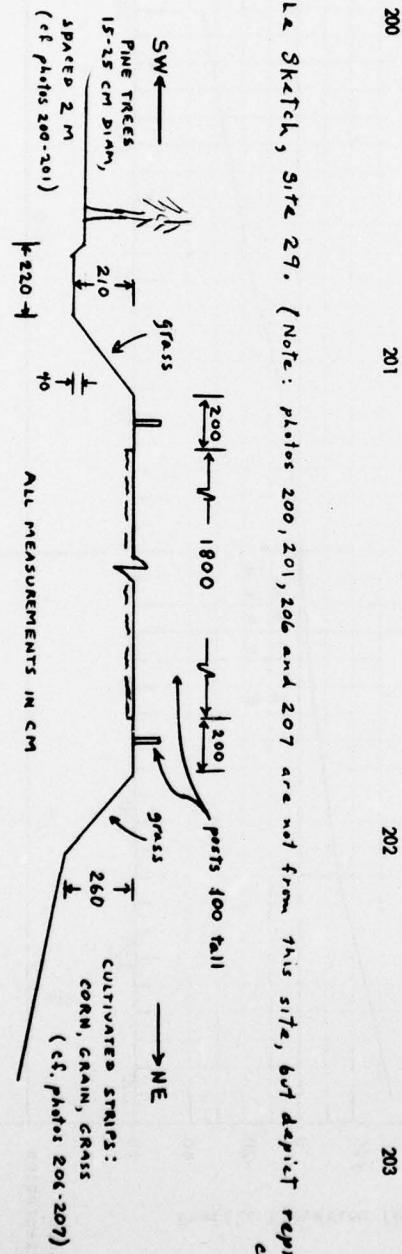
-2000

N E

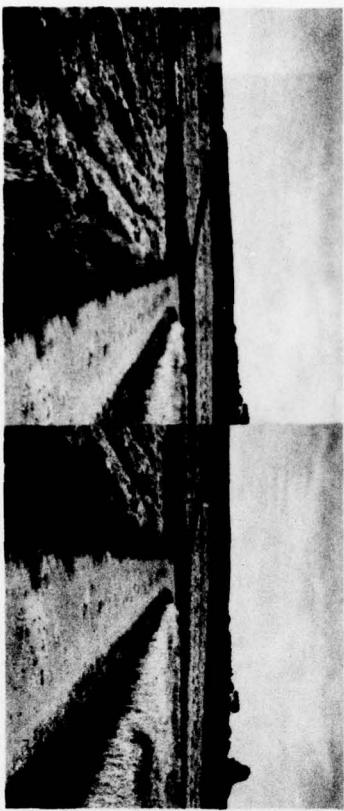
S W



Profile Sketch, Site 29. (Note: photos 200, 201, 206 and 207 are not from this site, but depict representative conditions.)



SUPPLEMENTAL PHOTOGRAPHS FOR UNDESIGNATED SITES (Sheet 1 of 3)



208



209

SUPPLEMENTAL PHOTOGRAPHS FOR UNDESIGNATED SITES (Sheet 2 of 3)



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205

206

207

210

211

SUPPLEMENTAL PHOTOGRAPHS FOR UNDESIGNATED SITES (Sheet 3 of 3)



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31

32



25



26

In accordance with letter from DAEN-RDC, DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Addor, Eugene E
Description of terrain to be used in evaluating the Lofted Mine Concept / by Eugene E. Addor, Edward E. Garrett. Vicksburg, Miss. : U. S. Waterways Experiment Station, 1977. 12, 26, 152 p. : ill. ; 27 x 38 cm. (Miscellaneous paper - U. S. Army Engineer Waterways Experiment Station; M-77-11) Prepared for U. S. Army Materiel Systems Analysis Agency, Aberdeen Proving Ground, Maryland, and Office, Chief of Engineers, U. S. Army, Washington, D. C., under Project 4A7527304T02.
1. Lofted Mine Concept. 2. Mines (Ordnance). 3. Performance predictions. 4. Terrain. 5. Terrain analysis. 6. Terrain data. I. Garrett, Edward E., joint author. II. United States Army Materiel Systems Analysis Agency. III. United States Army, Corps of Engineers. IV. Series: United States, Waterways Experiment Station, Vicksburg, Miss. Miscellaneous paper ; M-77-11. FTR7. N34m no.M-77-11

